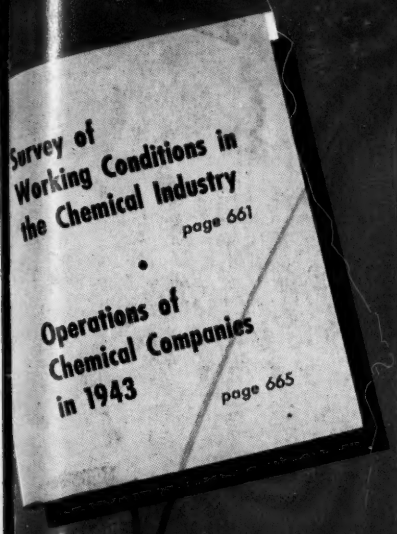
May 1944



Chemical Industries

The Chemical Business Magazine

TECHNOLOGY DEPT:
ANOTHER STEP TO AID IN

"Serving Industry . . . Which Serves Mankind"

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JUN 8 1944
DETROIT

Monsanto Chemical Company, producer of more than 300 basic chemical and plastics products, announces acquisition of I. F. Lauck's, Inc., world's largest manufacturer of industrial glues and producer of other products in the paint and wood preservative fields.

Through this step, the forest-products industries have available combined facilities heretofore unapproached in their field. These facilities now include:

I. F. Laucks, Inc., experience of more than two decades; PLUS the Laucks personnel, maintained intact to provide the individualized and specialized service for which Laucks is famous; PLUS the I. F. Laucks, Inc., plants in Seattle, Vancouver, B. C., and Los Angeles and other Laucks, Inc., interests elsewhere in the United States, Canada and overseas

. . . PLUS the six Monsanto research laboratories, including a central research laboratory — one of the largest in this country devoted exclusively to advance industrial research

. . . PLUS nineteen Monsanto manufacturing plants in the United States and additional plants in England, Wales, Canada, Australia and Brazil — producing a range of commodities extending from heavy chemicals through fine pharmaceuticals and food chemicals to one of the widest ranges of plastics in existence

. . . PLUS facilities to supply raw materials for existing and potential forest-product applications that are possible only in an integrated operation such as that now afforded by the union of Laucks and Monsanto.

United for service to the forest-products industries, Laucks and Monsanto now are one — a single organization equipped to meet the needs of the splendid present and the even more promising future of the forest-products industries. MONSANTO CHEMICAL COMPANY, ST. LOUIS 4.

MONSANTO
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SERVING INDUSTRY . . . WHICH SERVES MANKIND

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Glass is vital and versatile . . . it magnifies the infinitesimal . . . it reflects light that pierces darkness . . . it absorbs or transmits wave lengths and images. The wonders of Glass serve mankind in war as in peace. Vital to Glass are Solvay Alkalies and related products . . . for in war as in peace alkalies are indispensable.

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CAUSTIC POTASH

POTASSIUM CAR-BONATE

SODA ASH

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TECHNOLOGY DEPT

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Caustic Soda
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Perchlorethylene
Carbon Bisulfide
Sulfur Chloride

PHOSPHATES

Phosphoric Acid
Sodium Phosphates
(mono, di- and tri-basic)
Tetra Sodium Pyrophosphate
Acid Sodium Pyrophosphate

BARIUM PRODUCTS*

Barium Oxide
Barium Carbonate
Barium Hydrate
Barium Nitrate
Barium Peroxide

MAGNESIUM PRODUCTS

Magnesium Oxide, Caustic Calcined
Magnesium Oxide, Refractory
Magnesium Hydroxide
Magnesium Chloride
Magnesium Silicate

OTHER CHEMICALS

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Blanc Fixe
Bromine
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Epsom Salts
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**Produced by Barium Products, Ltd.*

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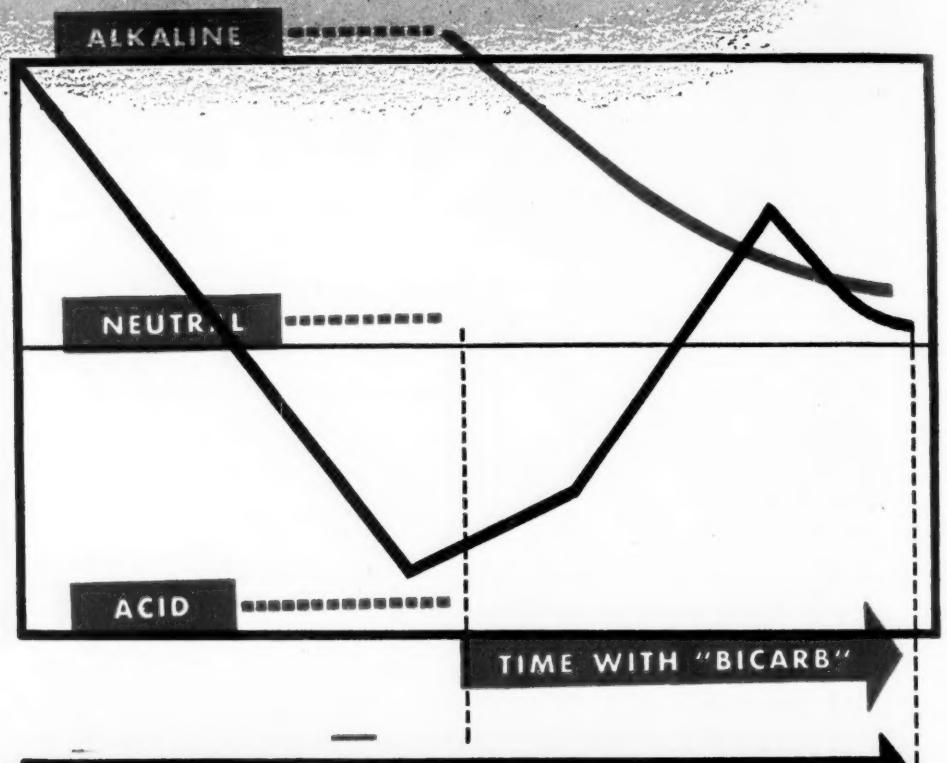
USE "BICARB" TO REMOVE CAUSTIC!*



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ACID: ——

A NEW MATHIESON DEVELOPMENT

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These advantages, plus new ones stemming from intensive research, may hold important meaning for you – may bring to light possibilities you haven't thought of.

While complete details for the utilization of this process have been evolved specifically for textiles, Mathieson Research is prepared to carry out further assignments in other fields.

For best results, consult our Technical Staff in regard to adapting this new Mathieson development to your particular operations. Write for further information.

Mathieson
CHEMICALS

*PATENT PENDING

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Chemical Industries
THE BUSINESS MAGAZINE for
MAKERS and USERS of CHEMICALS
Management • Research • Production • Marketing

VOL. 54—NO. 5

May, 1944

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THE READER WRITES

Classification of Engineers

To the Editor of Chemical Industries:

I have recently had occasion to examine the Engineering and Chemical Sciences Check List, Form 100-94 of the National Roster of Scientific and Specialized Personnel. This was evidently prepared by someone who was strongly under the influence of the small group which still holds to the belief that chemical engineering (and indeed all process engineering) is a branch of chemistry. There are many more men now being trained as chemical engineers than there are as chemists, and yet chemical engineering gets only one-quarter of one page in the Check List where chemistry gets two full pages.

Chemical engineers all know something of unit operations, and some of them become specialists in that field to which the chemical engineer is restricted in the Check List. Most of the chemical engineers are employed in development or manufacturing work and become specialists in a particular industry.

Suppose a chemical engineer (or a mechanical engineer) is skilled in the development of high octane gasoline or synthetic rubber. The only place he can show that important specialization is to list himself as skilled in organic chemistry (40.7.39 or 40.8.29). There is a listing entitled Petroleum and Natural Gas Engineering, but on examination it is found that deals only with production and storage. A man skilled in petroleum refining or in rubber technology must either wrongfully declare that his principal field is organic chemistry or that he is a specialist in unit operations. Or if he is a mechanical engineer, he might declare himself to be a specialist in Machinery and Equipment, General, although there would be nothing in that classification to show the industry in which he was skilled.

I note that the approval of this Form 100-94 expires June 30, 1944, so that it is possibly in the process of revision now. I suggest that a group of engineers familiar with industrial processes be called in to assist in its revision, so that registrants may be able to declare their fields of specialization more accurately.

CHEMICAL ENGINEER.

Townend, Not Townsend

To the Editor of Chemical Industries:

In your March issue, you published a short article on "Zinlac—Shellac Substitute."

However your overzealous proofreader inserted an extraneous "s" in my name as one of the co-authors.

R. V. TOWNEND, Technical Director
William Zinsser & Co., Inc.
New York 19, N. Y.

D.D.T. Pioneer

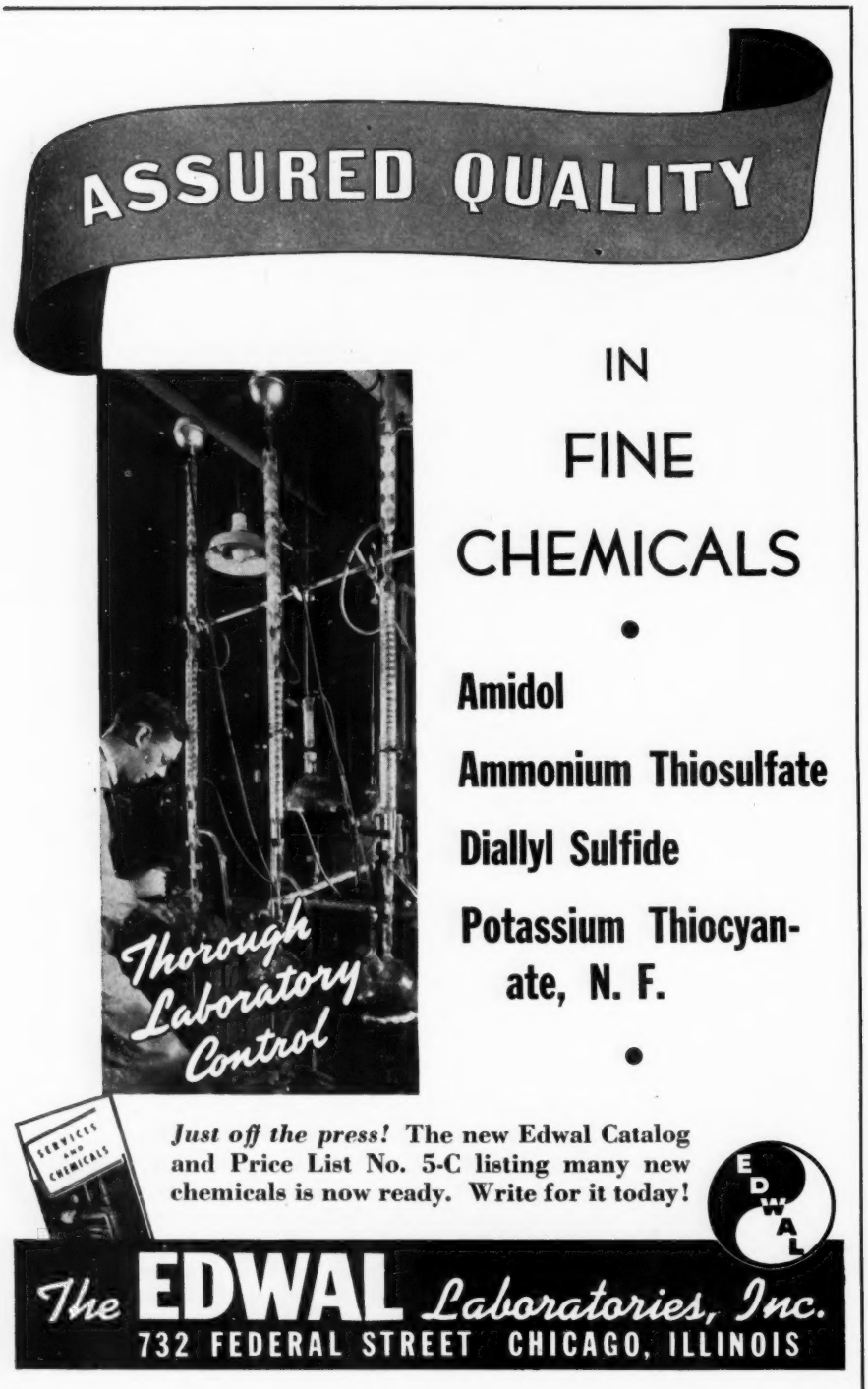
To the Editor of Chemical Industries:

We have read with much interest your article "Typhus Insecticide Production Increased" in the February, 1944, issue of your magazine.

Our reason for writing is that as far as D.D.T is concerned, your article gives publicity to about everybody except to the one firm that deserves the credit if any is due.

The manufacture of D.D.T. in the United States has been pioneered by the Cincinnati Chemical Works, Incorporated, Cincinnati, Ohio. They set up the first pilot plants and subsequently full-scale manufacture. They not only supplied the quantities needed for testing purposes by the various government agencies, but up to this date of the quantities needed by the Armed Forces.

O. FREY, Treasurer and Gen'l Mgr.
Cincinnati Chemical Works, Inc.
Cincinnati 7, Ohio



CHROMIUM CHEMICALS

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help keep our ships at sea

Chromium chemicals help to deliver the goods by giving longer life to the cylinders of America's war engines. Our ships, moving across the seven seas to Allied battle-fronts, must deliver men and materials on schedule.

Many of the ships in our convoys are powered by Diesel engines and are withstanding unusual punishment. The men who are responsible for keeping our ships at sea agree that plating the cylinder walls and other bearing surfaces of Diesel and aircraft engines with chromic acid has improved the lubricating properties and reduced wear.

Chromium chemicals have also proved of great value in preventing corrosion in water jackets of marine Diesel engines. Corrosion in water jackets and radiators of internal combustion engines has been a serious problem. Now, to maintain high-cooling efficiency the use of bichromates as corrosion inhibitors is accepted practice.

BICHROMATE OF POTASH • BICHROMATE OF SODA • CHROMIC ACID

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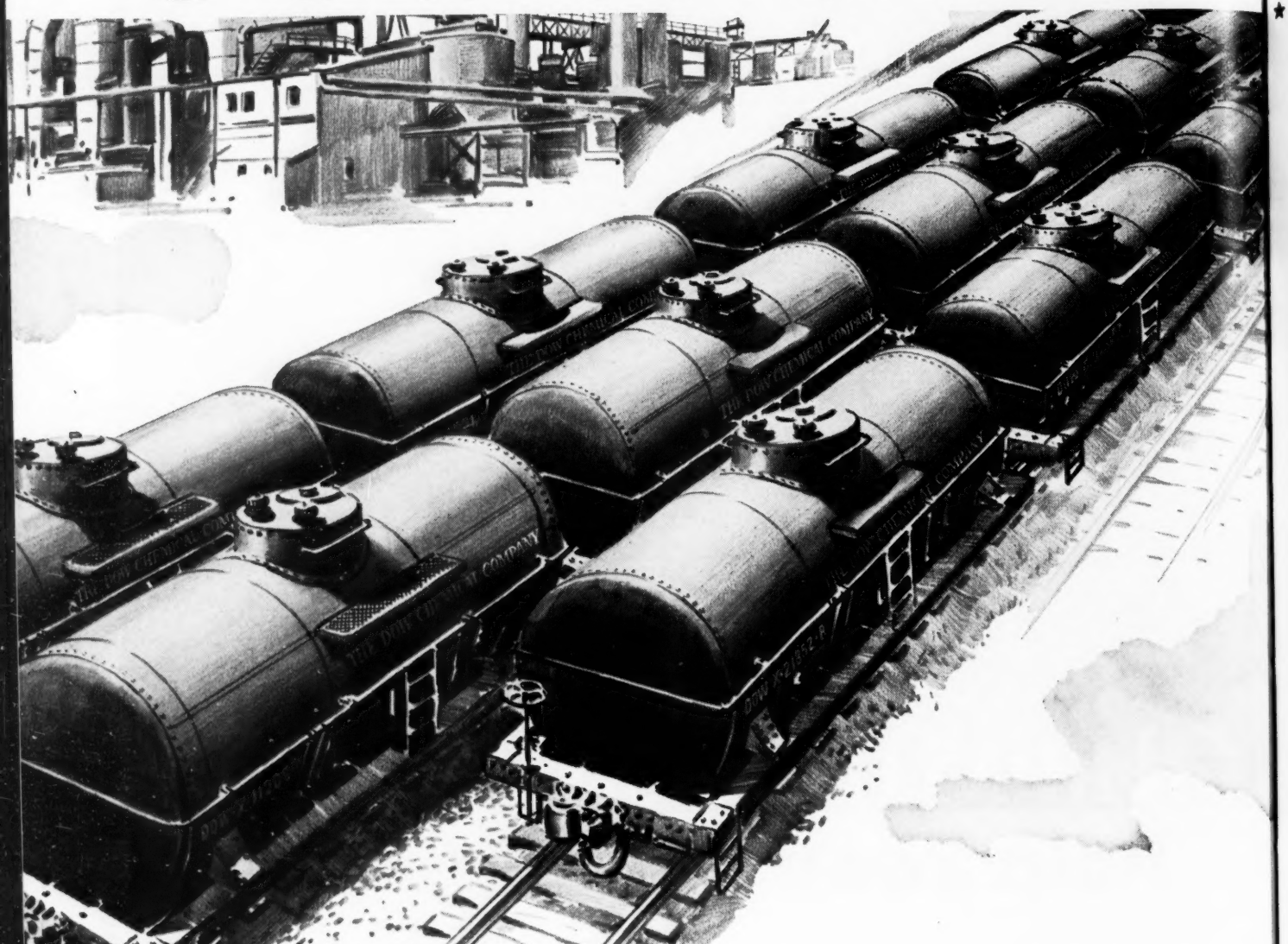

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Ever since the early 1900's Dow has been a leading supplier of Phenol. Today, newly enlarged production facilities place Dow far in the foreground of the world's Phenol manufacturers . . . traditional Dow quality and dependability have boosted Dow Phenol sales to an all-time high. Thus Dow is now recognized as the largest producer of Phenol, as well as a major supplier of other important industrial chemicals. Requests for complete information on Dow chemicals will receive prompt attention.

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CHEMICALS INDISPENSABLE
TO INDUSTRY AND VICTORY

WASHINGTON

T. N. SANDIFER *reporting*

Manpower . WPB Shake-Up . Status of Fuel Projects Influence of Small Business Increasing . H. R. 4446

The Manpower Scene

THE MANPOWER PLIGHT of the chemical manufacturers is back where it was, meaning that unless some action occurs before this appears in print, none of the supposed palliatives have had much effect. At this stage the outlook, in the opinion of industry spokesmen, is that later it may be necessary to withdraw some men from the armed forces and put them back to work in chemical plants if production goals are to be met.

The principal stumbling block appears to be the State Boards. These have exercised extreme independence in passing on deferment requests, and beyond these, the local boards have also been difficult to deal with. The final obstacle, however, as one industry man said, is that "There is no appeal from the General Staff."

In other words, the Army, primarily, has decided that it wants more men, of a category getting harder to find each week, and any objections when it seeks to take such of these men as it has found, are more or less academic. One of the complications in the overall situation is that manpower statistics from one or another agency, no matter how official, can no longer be accepted at face value by Congress, or by secondary agencies involved. There are discrepancies, for illustration, between the Army's estimate of the manpower for labor, and that of WMC, and an outsider might legitimately raise a question on the confusion that has resulted here over other such differences, as to whether such statistical pictures are actually objective, or designed to bolster a case.

At this writing the Army is admittedly on the eve of a new offensive, which may have broken by the time this appears. Under the circumstances all factions in the Capital hesitate to question any request the Army might make, for manpower or materials.

The Army is not altogether escaping criticism in the present manpower crisis, however. The Alaskan delegate, Mr. Dimond, has just revealed on the floor of the House, that the Army at one time took approximately 1,000 soldiers out of ranks, and assigned them to service on the Alaska Railroad, due to a shortage of regular workers, and, he continued, "They are working there now."

"Therefore," he commented, "I suggest it would be highly unwise to take a few civilians who may be eligible for military service, put them in uniform, then take an equivalent number out of the Army and set them to work on the Alaska Railroad."

Some of the unbalanced manpower situation, it is charged in other quarters, may be due to recurring spots of unemployment due to cutbacks, where the Army has made an overly-anxious guess as to its requirements of some item, only to find later it didn't need either the item, or the quantity it anticipated. However, nobody blames the Army too much for this. War is an unpredictable business. An Army critic has also made the point that the weather service maintained by that branch of the armed forces duplicates work by CAA. This may or may not be valid criticism.

Compared with the relatively trifling hoardings charged up in these scattered observations, Congress really was incensed when the Interior Department's appropriations were up, and it was brought out that this department had sought 2,073 occupational deferments out of a total of just under 7,000 employees, including a number between the ages of 18 and 20.

Thus the government, at least in some of its branches, has apparently been seeking to hoard men that it demands instanter from private industry, and as a Congressman commented, the men in industry are all producing while those in Government are not.

Meanwhile, the War Production Board Office of Manpower Requirements has prepared a concise summary of steps which an employer should take to obtain full consideration for deferment of essential employees. This publication is entitled "Advice to Employers Regarding Selective Service Procedures." It deals with the steps an employer should take through local and State Selective Service channels before WPB can undertake to assist in the case of key employees.

WPB Reorganization

WPB IS UNDERGOING a certain amount of shaking up, with results that may be known when this appears. What probably won't be announced however, is that the changes were instigated from Administration sources, and that they followed a rather extensive sur-

vey by a "hatchet man" from the executive staff of the Administration. The principal issue that brought this intervention from outside was reconversion, on which Chairman Nelson of WPB has seemingly taken a more liberal attitude than some of his immediate Board associates but, in turn, has apparently failed to meet Congressional sentiment for still more liberal treatment of civilian production needs.

An advance guess is that the small business element now vocal in Washington will have much greater representation in the policy making that is expected to be undertaken shortly. On this point, a definition of "small business" was advanced some time ago by a Department of Justice official, and is being picked up in the Capital's small talk:

"We define a small businessman as anybody who can't afford a representative in Washington," said this official.

Anti-Monopoly Again

TOUCHED OFF BY THE REPORTED SALE of the government-financed Basic Magnesium plant at Las Vegas, Nevada, to Anaconda Copper Company, Rep. Voorhis of California has introduced in the House still another bill aimed at industrial monopolies. He will be recalled as having already authored a number of such bills—one requiring American corporations to register all cartel agreements with the Department of Justice, another aimed at companies acquiring blocks of patents allegedly to withhold them from competitive use.

The latest measure by Mr. Voorhis would make sales of government-owned plants or industries subject to veto by the Smaller War Plants Corporation where, in that agency's opinion, the sale might act to the competitive disadvantage of smaller concerns in the field, and would give the Federal government power to terminate any lease of such properties for private operation, whenever such plants began to be operated at 75 per cent of capacity or less.

Sale of the Basic plant, incidentally, was made after it and two others were shut down and three more partially curtailed due to magnesium production having overtaken the original large estimated needs of the armed services. The government stockpile and the capacity of existing facilities made it appear unnecessary to continue Basic's operation, it was explained recently by Philip D. Wilson, chief of the Aluminum-Magnesium Division of WPB.

Government Poison

IN THE COURSE OF pest eradication and control programs, Agriculture Department and other government agencies distribute a considerable amount of poisonous chemicals. A recent bill in Congress raises a question as to whether government practice in the handling and distribution of poisonous chemicals is in every case hedged with the safeguards enforced by private industry.

Giving rise to the bill was the case of a farmer who, using sodium arsenite furnished by a government agency for pest control, was alleged to have contracted ailments leading to permanent and total disability due to the failure of the government to furnish proper instructions. For this his Congressman sought to have Congress appropriate $10,000 as compensation.

Barytes

THE OFFICE OF PRICE ADMINISTRATION has granted some adjustments upward in the prices allowed a number of producers supplying chemical grade and other barytes, on their representations that increased wages and other production costs made it impossible for them to maintain production, or expand to meet the present shortage in these minerals.

H. R. 4446

SCIENTISTS, TECHNICAL PERSONNEL and other special people called in by the government for consultation with War Department, War Labor Board, the Office of Scientific Research and Development, and others, on either a voluntary basis or for limited fees, would be protected from operation of certain statutes, under a series of bills now before Congress. They were introduced by Rep. Cravens at the instance of the Judiciary Committee, and exempt such workers from laws prohibiting former government employees from pressing claims against the government, or practicing before government departments for two years after leaving government employ.

Since it has been necessary to call in many highly trained special advisors from industry and the colleges at limited or no compensation, it was not considered fair that they should be held to the limitations applying to a regular government employee. It was a general practice in the past that some such persons would work in an agency for several years, establish contacts, and perhaps obligations on other officials in the agency, then resign and begin a lucrative practice for private clientele before such departments.

Bureau of Mines Projects

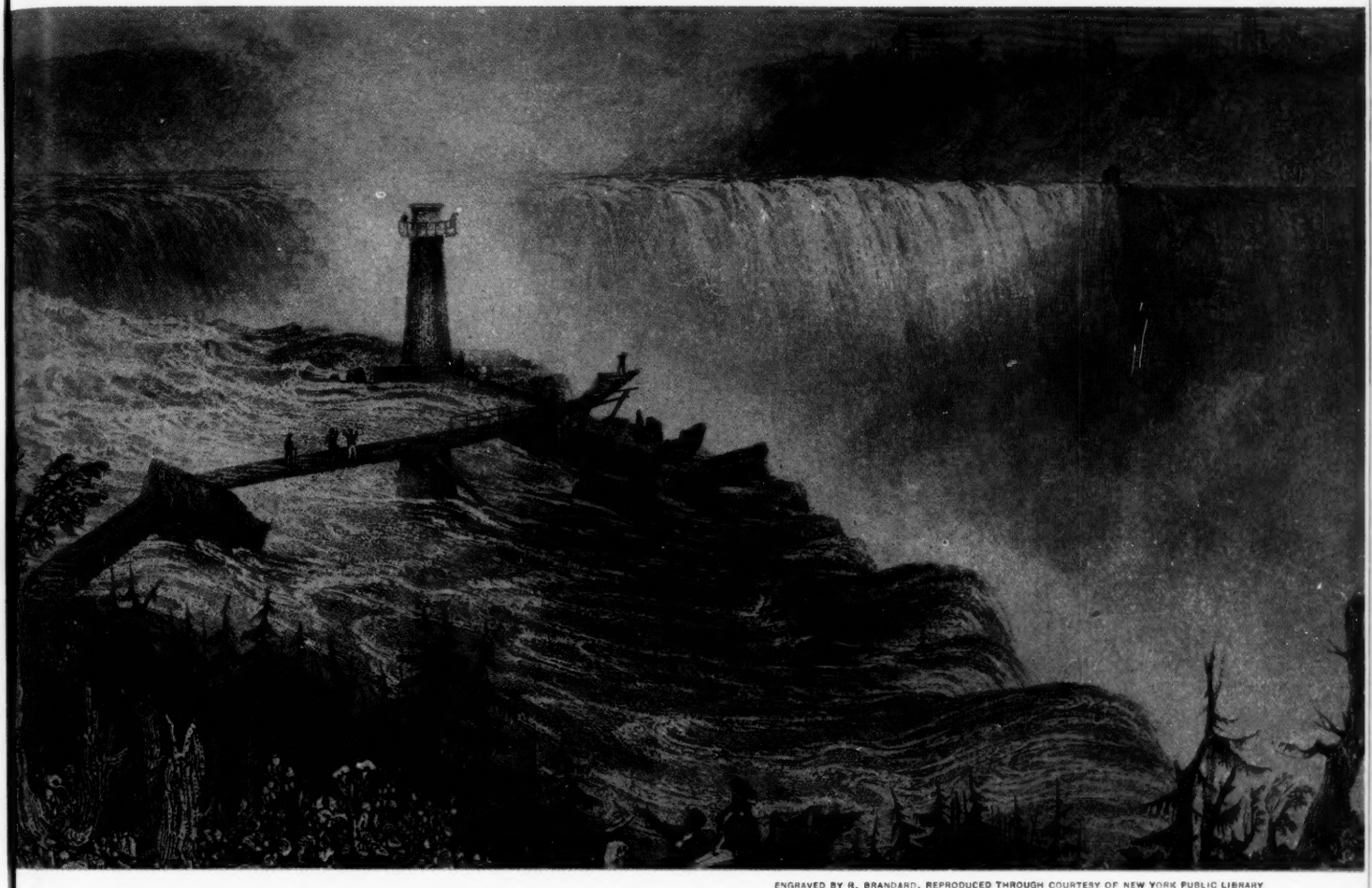
THE HOUSE CUT THE INTERIOR DEPARTMENT appropriation 23 per cent below that for the fiscal year 1944, and 9½ per cent below that estimated by the Budget Bureau as justified. It will be recalled that some weeks ago the House passed a bill authorizing appropriation of $30,000,000 to establish pilot plants and conduct experiments in transforming coal, shale, and other products into liquid fuel. The slashed appropriation bill omitted provision for this money, however, leaving the projects merely "authorized."

In conference with the Senate, it is expected that a strong effort will be made to put the money into the bill, as the Senate has some influential advocates of the program, Senator O'Mahoney among them.

There are still funds available to the Bureau of Mines for certain other plants actually working or projected such as for extraction of low grade alumina from certain clays.

TRADITIONS OF NIAGARA

Far-reaching Frontiers



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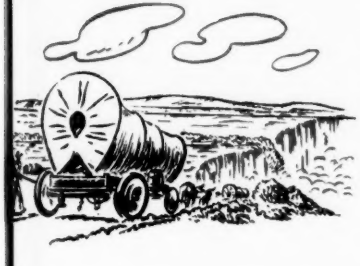

An Essential Part Of America's Great Chemical Enterprise

With a frontier history that makes a truly great chapter in American history, Niagara today looks out on a still larger frontier stretching into the future. Her vast power resources harnessed to the wheels of an expanding manufacturing area, she is helping to carry many important industries on to a new era of growth. Particularly significant is the expanding development of the chemical industry in the Niagara Falls area.

In this industry Niagara Alkali Company is one of the oldest and most progressive. Having helped America become chemically independent by pioneering the production, in this country, of several vitally important chemicals, Niagara today is devoting all its experience and modern manufacturing facilities to making increasing quantities of these and other chemicals available for vital wartime purposes. And in so doing, Niagara is learning new lessons in production and acquiring many new ways of serving its customers in the years that follow Victory.

CAUSTIC POTASH · CAUSTIC SODA · PARADICHLOROBENZENE
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ARMY E NAVY

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Benzyl Chloride • *Benzo Trichloride*
Benzal Chloride • *Benzoic Acid*
•
Formaldehyde • *Paraformaldehyde*
•
Pentaerythritol
•
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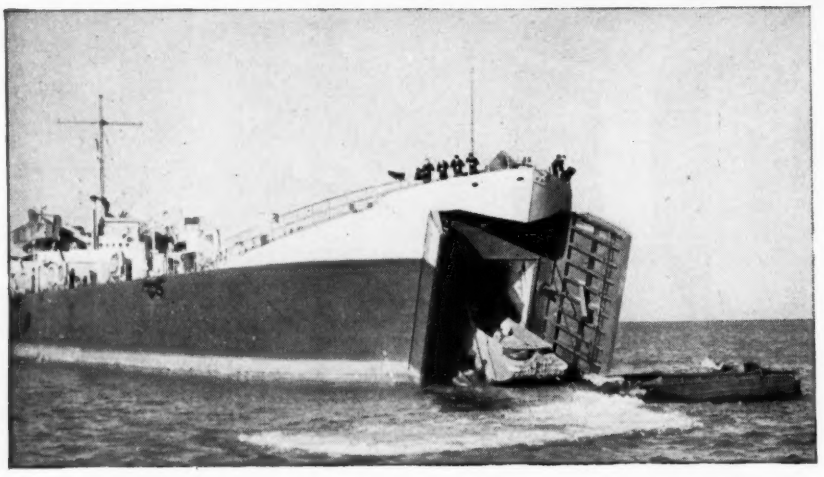
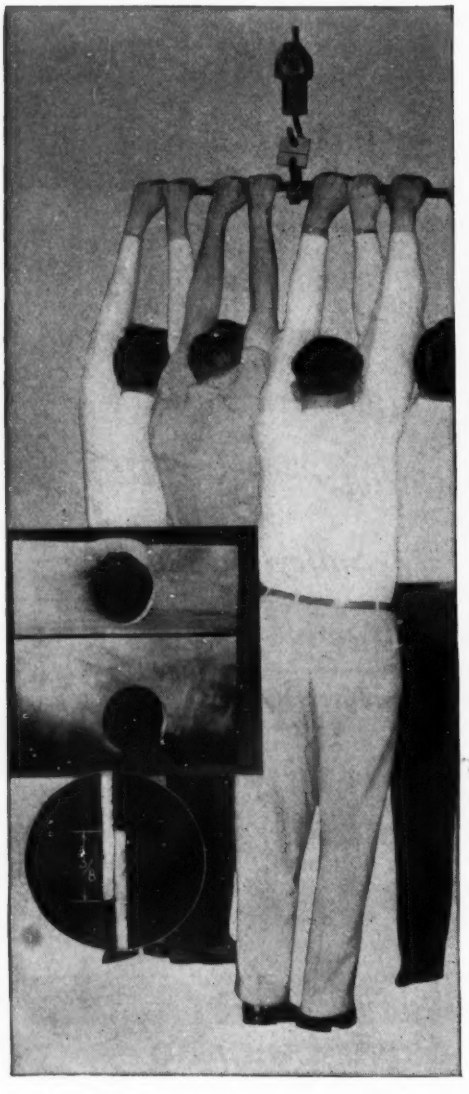


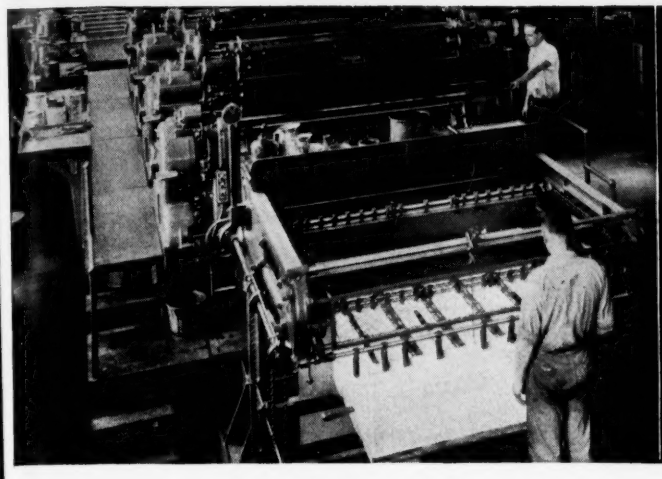
(*Left*) **DRESSED UP TO GO PLACES.** When the U.S. Navy's LST and similar landing craft "go calling" these days, the metal surfaces of these vessels are quite likely protected by a special corrosion-inhibiting alkyd-resin zinc chromate primer coat made to exacting "specs." This primer is readily produced with a xylene resin solution of Cyanamid's REZYL*728-5, one of the many resin vehicles developed by Cyanamid research for timely surface coating applications. For example, this corrosion-inhibiting primer made with Cyanamid's REZYL 728-5 may be applied to bare steel surfaces; sets to touch in 15 minutes; is dry and ready for camouflage coating in about an hour. This quick-drying, highly efficient primer is, therefore, proving a time-saving factor in speeding up the Navy's landing barge building program. In war service, too, are Cyanamid's other resins—MELMAC*, BEETLE*, TEGLAC*, and PHENAC**—whose quality formulations are meeting the rigid requirements of U. S. Army and Navy.



(*Left*) **THE COMBINED WEIGHT OF FOUR MEN CAN'T BREAK THIS ADHESIVE BOND** which joins the two pieces of aluminum illustrated at the left. "Welding with a paint brush" is the phrase by which the U. S. Stoneware Company, makers of REANITE, describe the versatility of their new bonding process. REANITE cement is applied by brush to the surfaces of the materials to be joined; permitted to dry for an hour; the surfaces are pressed together; and mild heat and pressure are applied. Suitable for uniting metal to metal, or rubber, synthetic rubber, plastics, leather, or wood to metal, or to each other, REANITE is reputed as providing a bond whose strength often surpasses that of the materials joined (see inset illustration to left) and which remains effective through a temperature range of from 50° F. to 300° F.

(*Above*) **A RARE SIGHT IS THIS NEW RUBBER TIRE** being lifted carefully from the curing mold. After three quarters of an hour in the mold this tire is cured and its tread design formed. An automatic timing device opened the mold and now the operator is lifting the tire out to send it on its way for final inspection. Of equal interest at this time is Cyanamid's AERO*AC 165, a much needed self-activating accelerator for GR-S. AERO AC 165 is one of a large family of chemicals developed by Cyanamid for the rubber industry. It is ideal for synthetic rubber formulations, dispersing readily and possessing low scorching tendencies, indicating safe processing. AERO AC 165 produces vulcanizates with good physical properties, cut growth resistance, and good aging characteristics.

Chemical Newsfront



(*Above*) **WATER RESISTANCE FOR PRINTING PAPERS** so that they may withstand printing by the offset process (left) and pass critical inspection (right) is imparted by the use of a new Cyanamid coating resin. Because, as a result of the war, there has been a notable increase in the use of starch as an adhesive for coated printing papers, it was essential that some method of improving the water resistance of such paper be devised. Cyanamid technicians quickly developed a method by which this desired water and wet rub resistance could be attained. The Cyanamid resin which forms the basis of this treatment is of the water dispersible thermo-setting type and, although the amount of resin required depends upon the degree of wet rub resistance desired, it is quite effective even when used in minor proportions. Papers coated with this Cyanamid-devised formulation are satisfactory for offset and lithographic printing.

(*Left*) **FOR FIGHTING EQUIPMENT THAT MUST TAKE IT** as well as hand it out, it is highly important that its geared and moving parts are toughened and hardened to withstand the stresses, strains, and wear of actual combat service. The proper case hardening and carburizing of such parts are one of the important reasons why Uncle Sam's tanks, guns and trucks are doing such a remarkable job in pressing the attack on all fronts. Cyanamid's AEROCASE*, AEROCARB*, and AEROCARB* DEEPCASE case hardening and carburizing compounds, because of their speed of penetration and the uniformity of depth of case that they provide, are being widely used. The lower cyanide content required in Cyanamid's activated carburizing baths as compared with the amount required in the non-activated type of cyanide case hardening compounds, enables Cyanamid's two-component case hardening and liquid carburizing baths to conserve important quantities of critical cyanide. Cyanamid has prepared a new 32-page reference text on case hardening and liquid carburizing which may be obtained on request.

*Reg. U. S. Pat. Off. **Trade-mark

American Cyanamid & Chemical Corporation

A Unit of American Cyanamid Company

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These G.I. SHOES Can Take It

What's that got to do with the shortage of Lanolin, Degras and Wool Grease for the home front? PLENTY!

Our soldiers' shoes can take it because they are made from top grade leathers that have been stuffed and waterproofed with wool grease to withstand mud, water and snow.

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Lanolin and Wool Greases Help Fight for Victory

BUY WAR BONDS

and support the fight

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An important aid in the production of

HIGH OCTANE GASOLINE

STANDARD SILICATE

Standard Silicate of Soda is used in the manufacture of a synthetic petroleum cracking catalyst employed extensively by oil refineries in the manufacture of high octane aviation gasoline.

To produce this catalyst pure silica is obtained from Silicate of Soda, and impregnated with other chemicals to produce the desired catalytic effect.

If you use *or if you are considering the use of* Silicate of Soda as a source of *pure* SILICA in your processes, let STANDARD SILICATE cooperate with you!

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Plants at CINCINNATI · JERSEY CITY · LOCKPORT, N. Y.
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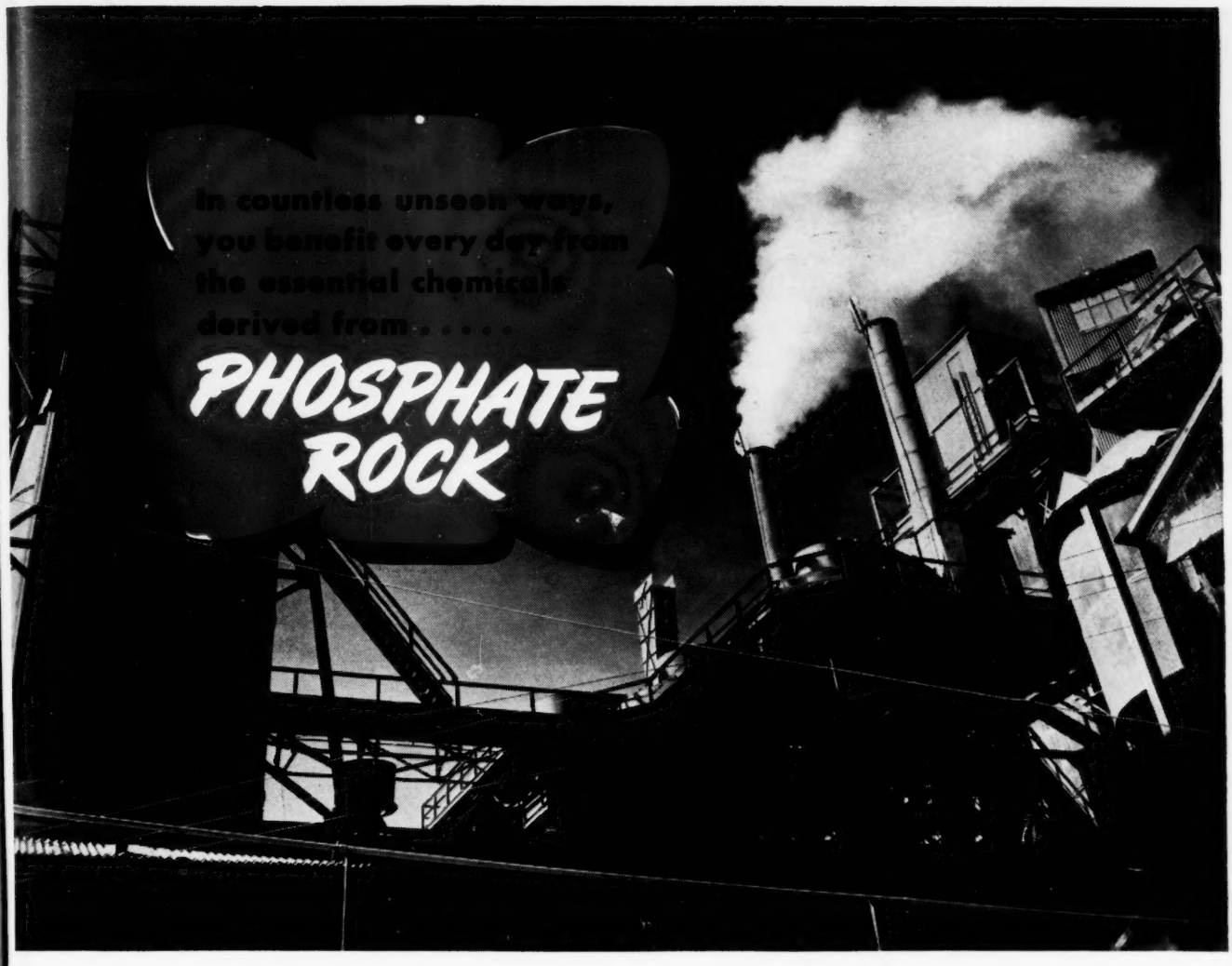

You enjoy the delicious flavor and nutritious value of fine foods because vital phosphorus chemicals are present in the soil or were added by the farmer in the form of plant food. Fruits and vegetables and cereals, tobacco and cotton, and poultry and cattle, too, depend on phosphorus for healthy growth. As the largest American miner of phosphate rock, International has produced agricultural phosphate at its Florida and Tennessee mines for 35 years. And now, from its new mine in the Montana field, International is preparing to produce phosphorus, phosphoric acid and phosphate chemicals for the rapidly developing agricultural areas of the northwest and for a wide variety of essential industrial purposes. *International Minerals & Chemical Corporation, 20 North Wacker Drive, Chicago 6, Illinois.*

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AT LAST...

KARBATE CENTRIFUGAL PUMPS

Trade-Mark

for corrosive liquids

THE "Karbate" Model A Centrifugal Pump, with a trouble-free rotary seal, is now available for the chemical process industries. From inlet to outlet, liquids handled by the pump are in contact with "Karbate" material, a treated carbon stock that is resistant to practically all corrosive fluids . . . including *mixtures of acids,* such as HCl and H_2SO_4.

Outstanding features of the "Karbate" Model A Centrifugal Pump are:

- **All "Karbate" construction**
- **No chance for metallic contamination of liquid**
- **"Karbate" rotary seal eliminates use of stuffing box—non-metallic compression member—no springs to rust**
- **All gaskets confined**

Because "Karbate" materials have exceptional resistance to extremes of thermal shock, sudden temperature variations of the fluid cannot damage the pump. Leakage is completely avoidable with reasonable care. Maintenance costs are extremely moderate.

Furnished in 3 sizes, the largest lifting fluids against a 100-foot head, the pump has proved itself in prolonged tests and has been giving satisfactory plant service for several years.

Our representatives will gladly furnish details on the pump characteristics and on the corrosive liquids it is now handling.

The registered trade-mark "Karbate" distinguishes products of National Carbon Company, Inc.

★ *BUY UNITED STATES WAR BONDS* ★

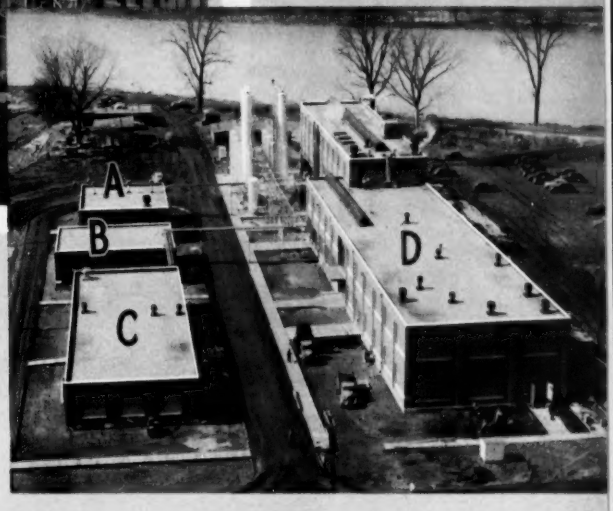
NATIONAL CARBON COMPANY, INC.
Unit of Union Carbide and Carbon Corporation

UCC

Carbon Products Division, Cleveland 1, Ohio
New York, Pittsburgh, Chicago, San Francisco

From blueprint to mass production in six months . . . *the remarkable story of* PENICILLIN - C.S.C.

Commercial Solvents penicillin plant was specially engineered by E. B. Badger & Sons Co.



View of the CSC penicillin plant showing: A—compressor building; B–storage building; C—air-conditioned animal house; D—main production building.

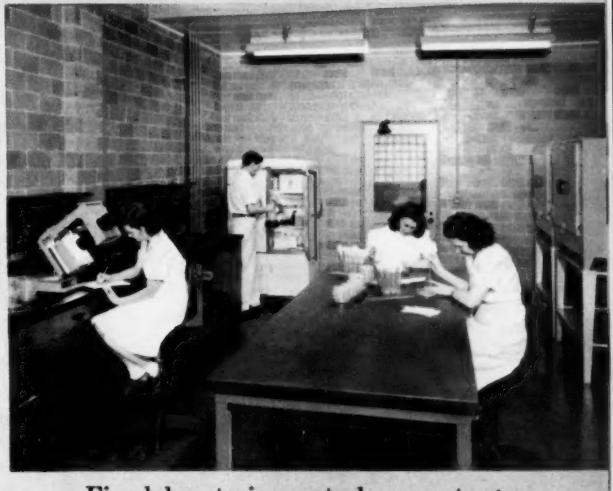
When the curative properties of penicillin were recognized, the government called for huge quantities of this life-saving substance for use by our armed forces . . . quantities far exceeding the output possible with previously known methods.

A quarter-century's experience with microbiological processes enabled Commercial Solvents to bring Penicillin-C.S.C. into mass production in an incredibly short time. The special plant shown above—located at Terre Haute, Indiana—was designed, built, and placed in successful operation in less than six months.

The capacity of the CSC penicillin plant is conservatively rated at 40,000,000,000 (forty billion) Oxford Units per month . . . or twice the amount of penicillin produced in the United States during the entire year 1943.

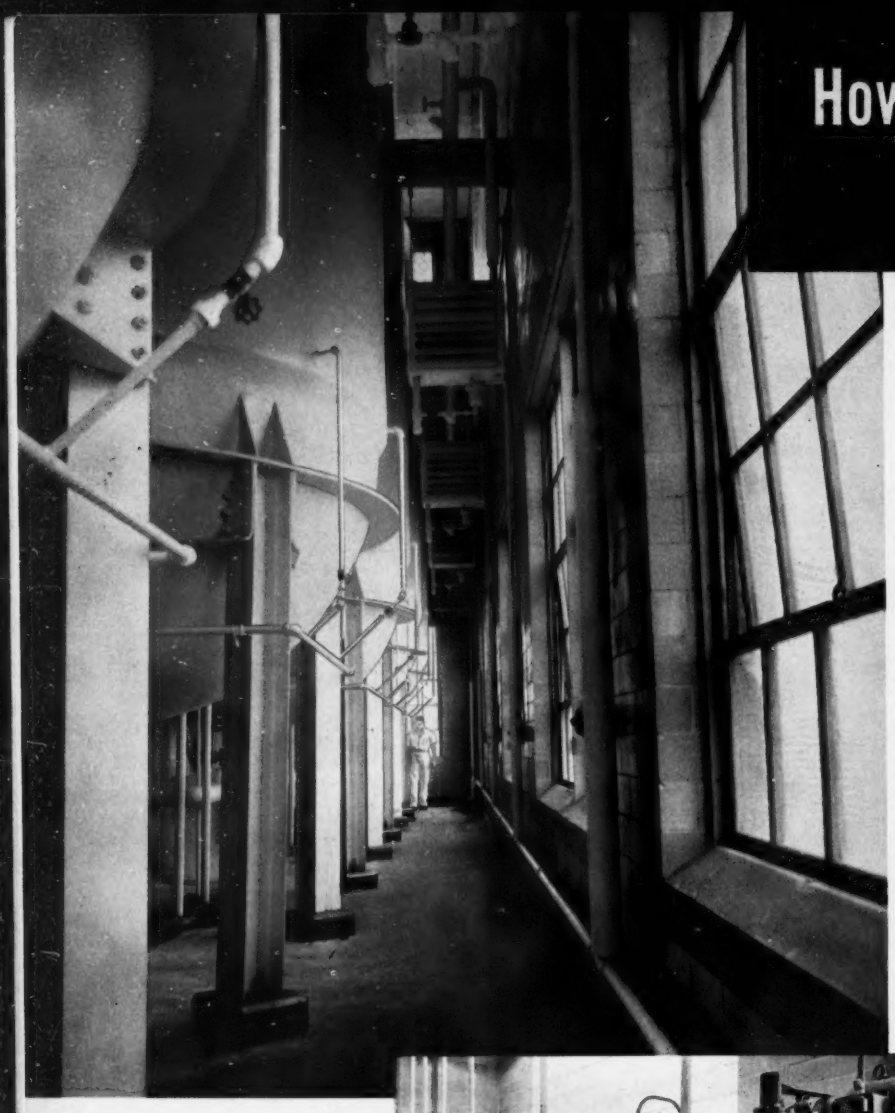
●

Workers in the sterile area must use the precautions of a surgeon preparing for an operation. They wear eye shades to protect against eye burns from ultra-violet lamps.

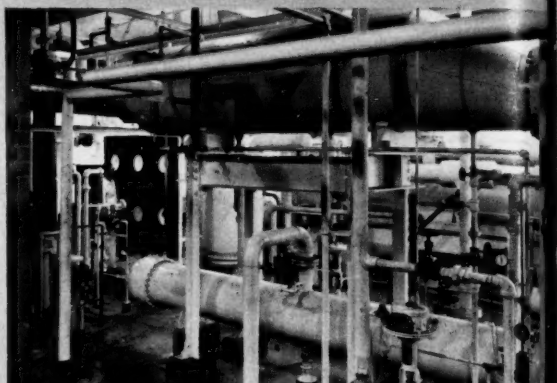


Five laboratories control every step in the production of Penicillin-C.S.C. Above is the Assay Laboratory which determines potency.

How Modern Production the Output of

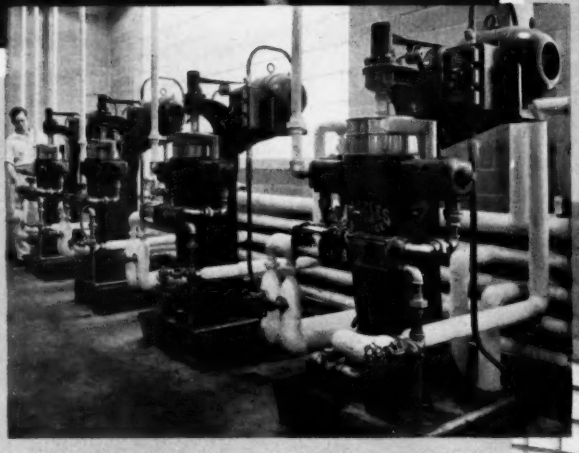


1 Fermentation tanks where the mold (*Penicillium notatum*) is grown by the new "deep culture process." A battery of these three-story-high tanks is in constant use. ←



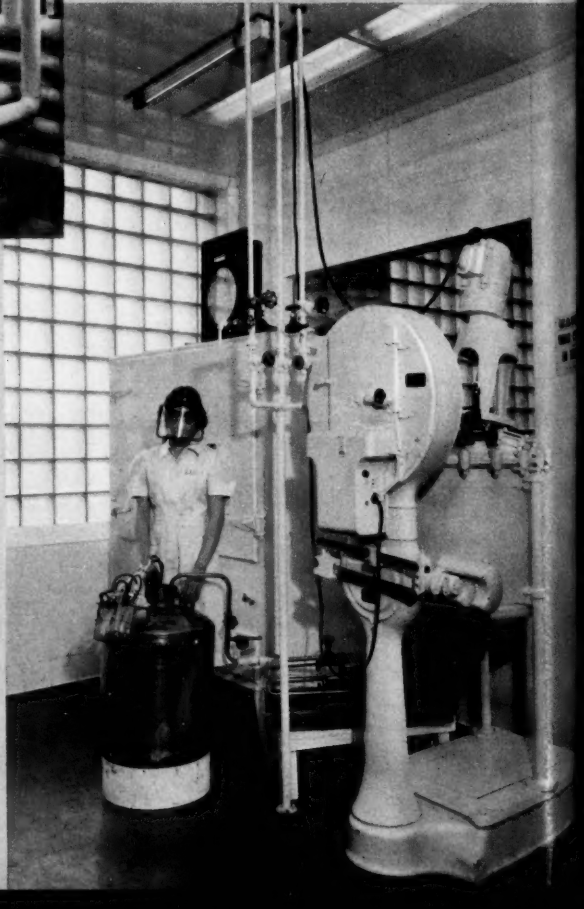
2 The penicillin, generated in the culture liquor, is concentrated in a solvent with this equipment. ↑

4 The 20-gallon bulk container (before operator) holds all the concentrated penicillin solution obtained from one of the huge fermentation tanks, which after drying will yield approximately 4.0—5.5 pounds of dry product. ↓

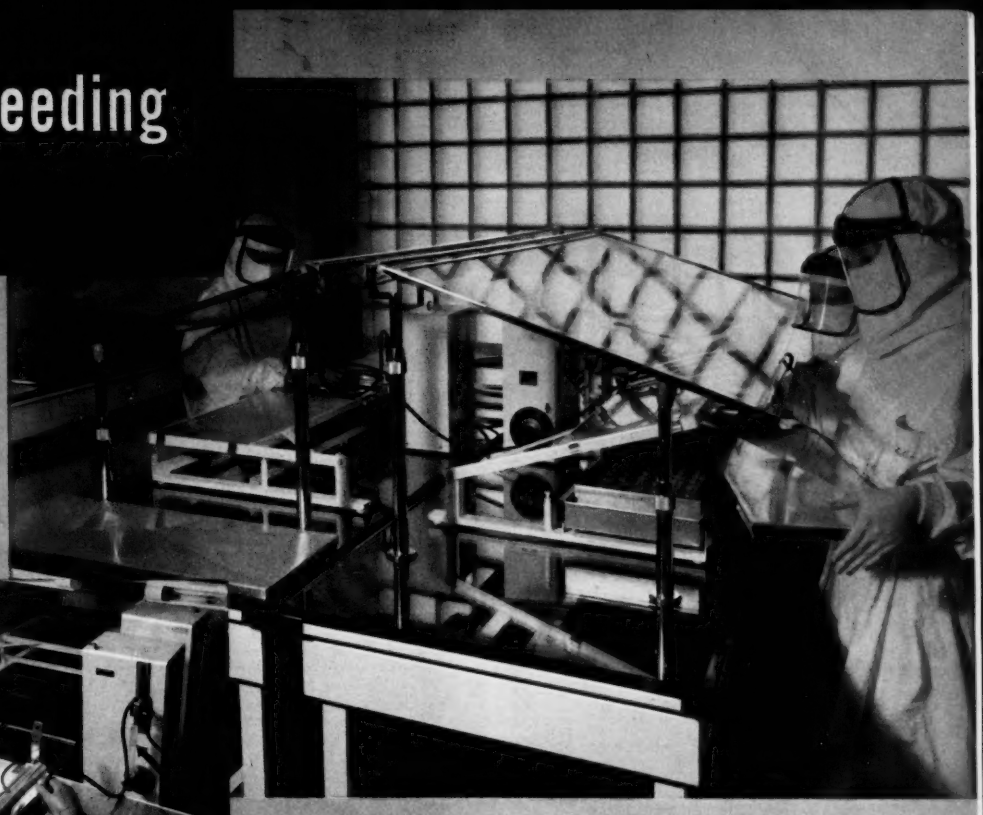


3 With high speed supercentrifuges, emulsions of water and solvent are separated preparatory to treatment with chemicals. Penicillin is supplied as a sodium salt. →

5 Vials in which Penicillin-C.S.C. is packed are washed and sterilized. ↓

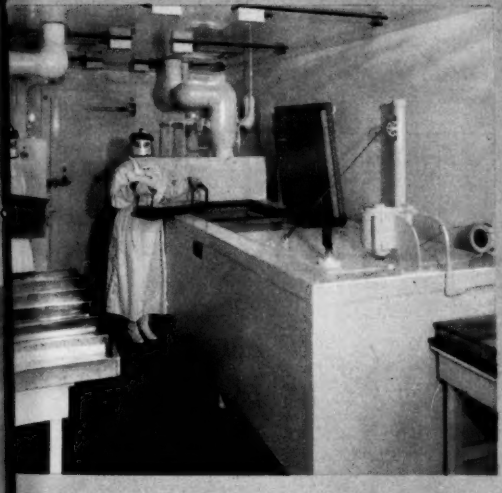


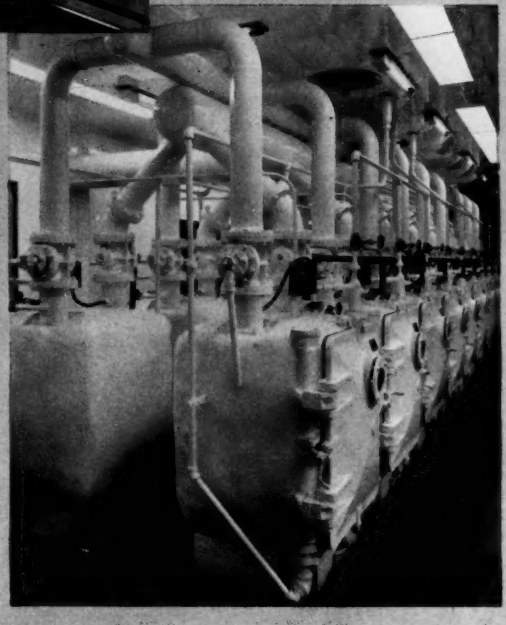
Methods are Speeding PENICILLIN-C.S.C.



6 This is how the concentrated solution of Penicillin-C.S.C. is placed in vials. Inset (below) shows a closeup of the filling operation, with arrow pointing to the metering pump which delivers a quantity (predetermined by potency) which is measured accurately to 5/100ths of a cubic centimeter.

7 Worker placing a tray of vials in the deep-freeze chamber. Room temperature is kept at freezing—hence workers must dress warmly.

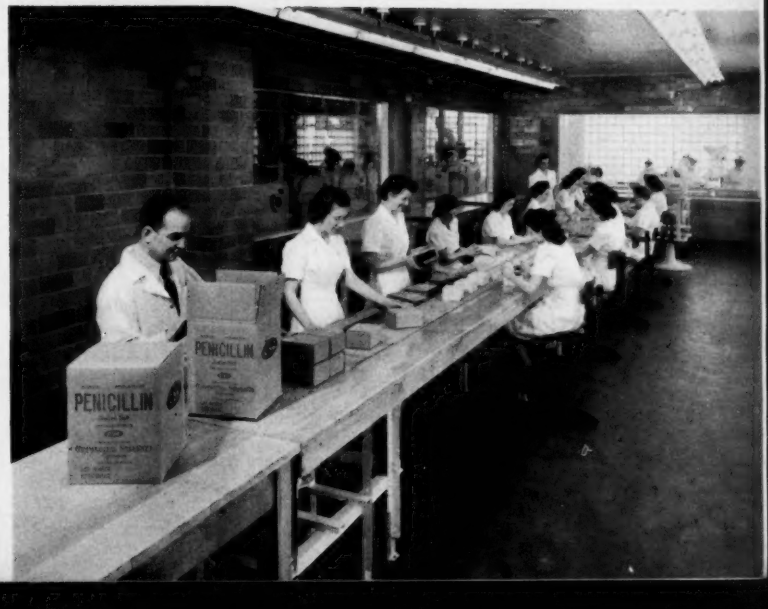


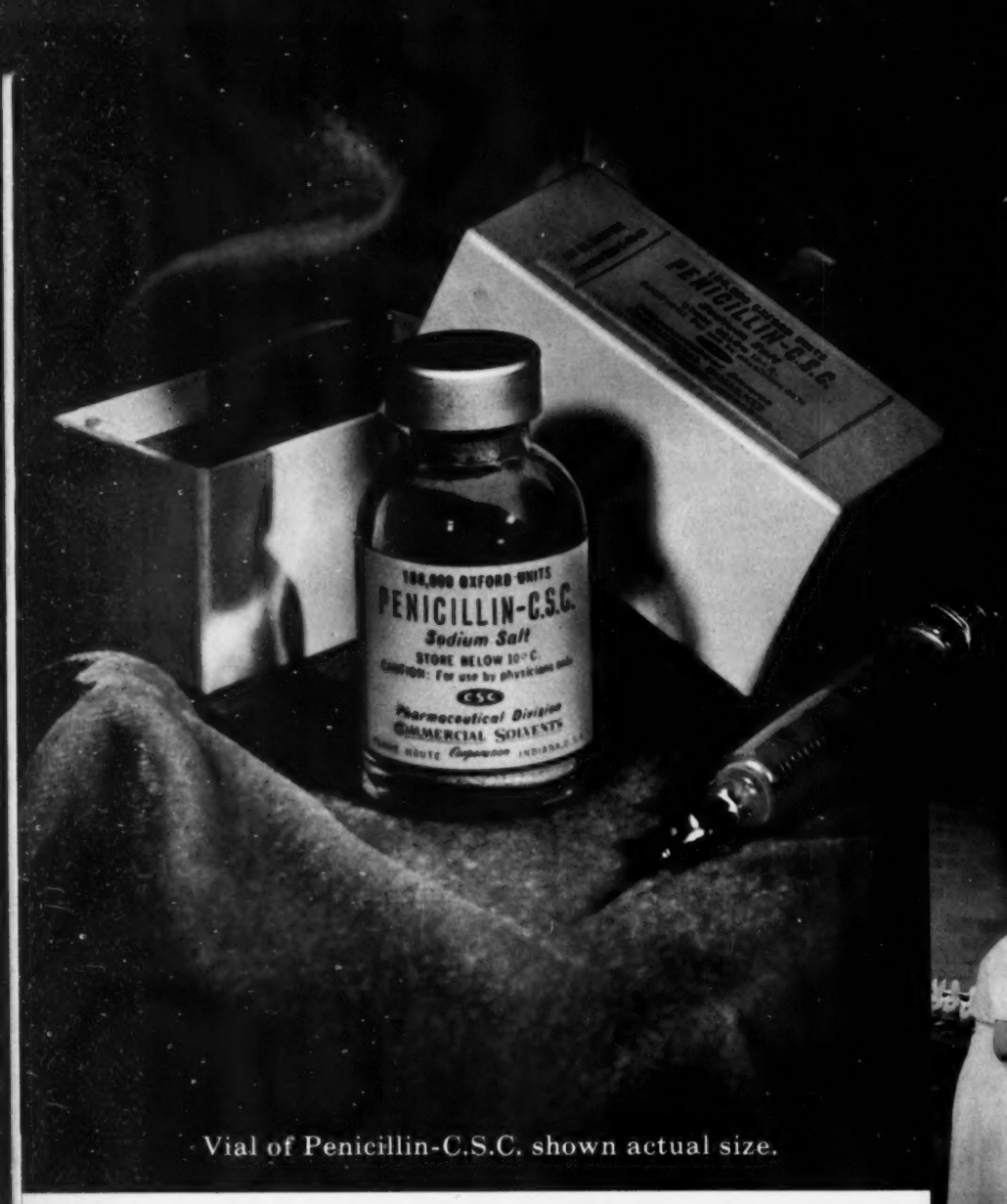


8 Vials containing frozen penicillin solution are placed in these dehydrators, where a high vacuum removes moisture, leaving the penicillin salt as a dry yellow powder in the bottom of each vial.

9 Last room in the sterile area, where rubber stoppers are placed in the vials, which are then sealed with aluminum caps.

10 Packaging is an assembly line operation. All Penicillin-C.S.C. now produced is under strict government allocation . . . but as soon as military needs have been met, Penicillin-C.S.C. will become available for civilian medical practice.



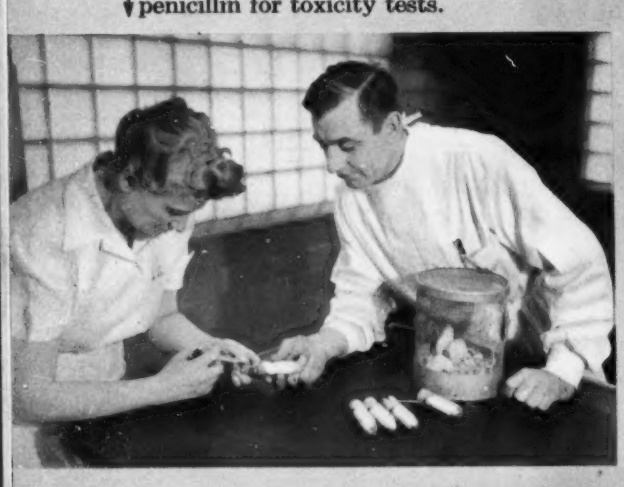


Vial of Penicillin-C.S.C. shown actual size.

Penicillin-C.S.C. is stored below 10° C. in order to safeguard its potency. For administration, the yellow powder is usually dissolved in physiological saline solution. Each vial supplies enough Penicillin-C.S.C. for several doses, depending upon the infection to be treated. In many infectious diseases penicillin has proved more advantageous than any other treatment. Such diseases include certain types of pneumonia, meningitis, gas gangrene, osteomyelitis, and other wound infections, as well as the more prevalent venereal diseases.

Rabbits are lined up in stanchions for the pyrogen tests. They are not injured, the same rabbits being used several times.

The mice in these bottles are alive—breathing through a hole in the tip of the bottle. They are being inoculated with penicillin for toxicity tests.



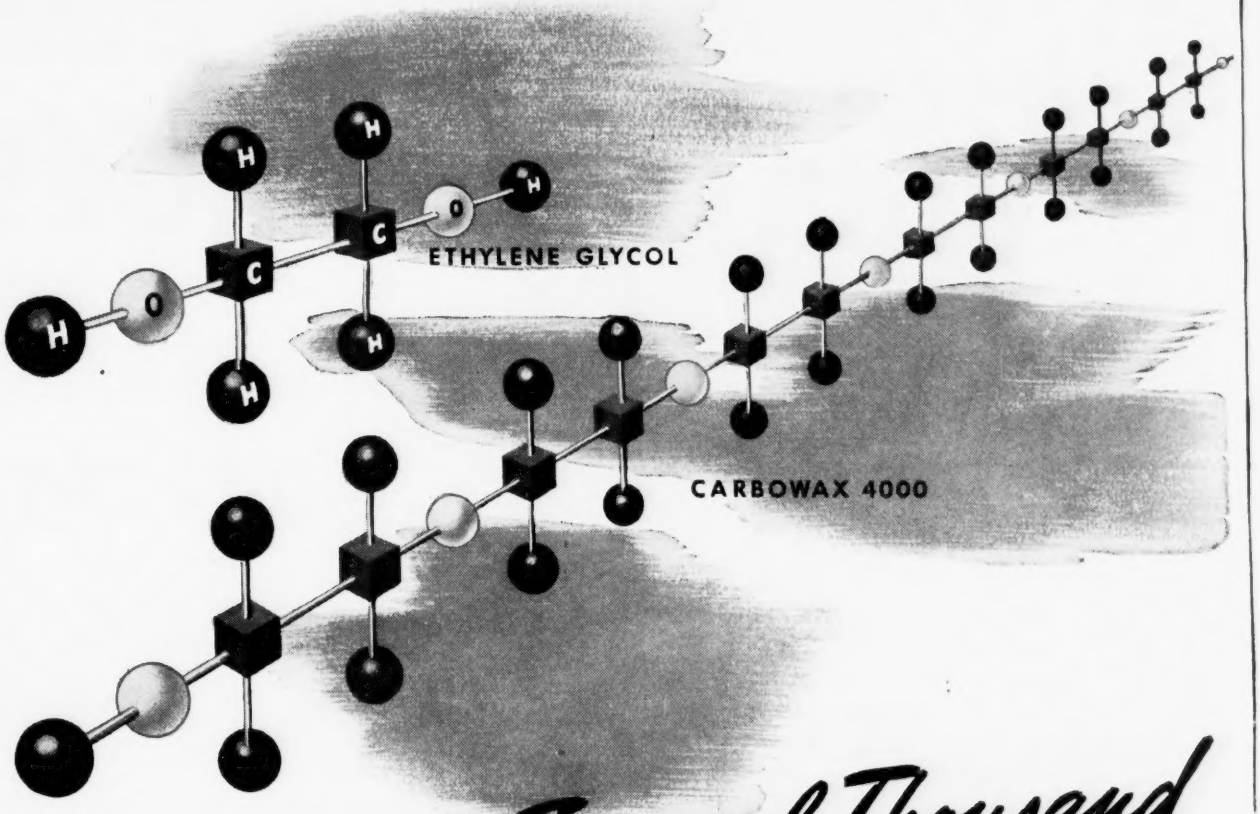
In cages such as these are housed 1,000 New Zealand White rabbits and 2,000 white mice.

Commercial Solvents maintains a large, fully air-conditioned animal house, with specially bred rabbits and mice.

CSC

COMMERCIAL SOLVENTS

17 East 42nd Street *Corporation* New York 17, N. Y.



From 62 to Several Thousand

THE two molecules pictured here are smallest and largest in the family of glycols produced by Carbide and Carbon Chemicals Corporation. With molecular weights from 62 for liquid Ethylene Glycol to several thousand for wax-like Carbowax compound 4000, the family consists of 5 simple glycols and numerous polyglycol mixtures. These chemicals are so important that some of them are now restricted to essential war applications.

These glycols have distinctive family traits: water solubility, a wide range of hygroscopicities, low vapor pressures, high boiling points, and the ability to lower the freezing point of water. Glycols, therefore, are particularly important today in liquid-cooled aircraft engines, hydraulic fluids, electrolytic condensers, and low-freezing dynamites.

Certain glycols are used in wetting sand molds for casting magnesium alloy aircraft parts. Others are employed in synthetic resins; in moistening and softening tobacco, cork, glue, casein, paper products, and textile fibers; and in the dehydration of natural gas.

Carbide and Carbon Chemicals Corporation was the first chemical company to develop large-scale production of glycols. Our chemists and engineers have also pioneered the development and production of 12 other important chemical families . . . including alcohols, ethers, amines, and ketones . . . useful raw materials for many industries.

Today we are producing in commercial quantities more than 160 synthetic organic chemicals . . . and more than 40 of these in tank car quantities. After the war these versatile chemicals will be available in greater quantities than ever before, and many new compounds with them.

For further information about the use of these chemicals, write to us.

SOME OF THE GLYCOLS WE MAKE

Ethylene Glycol
Diethylene Glycol
Triethylene Glycol
Polyethylene Glycols
Carbowax Compounds
Propylene Glycol
Dipropylene Glycol

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Unit of Union Carbide and Carbon Corporation

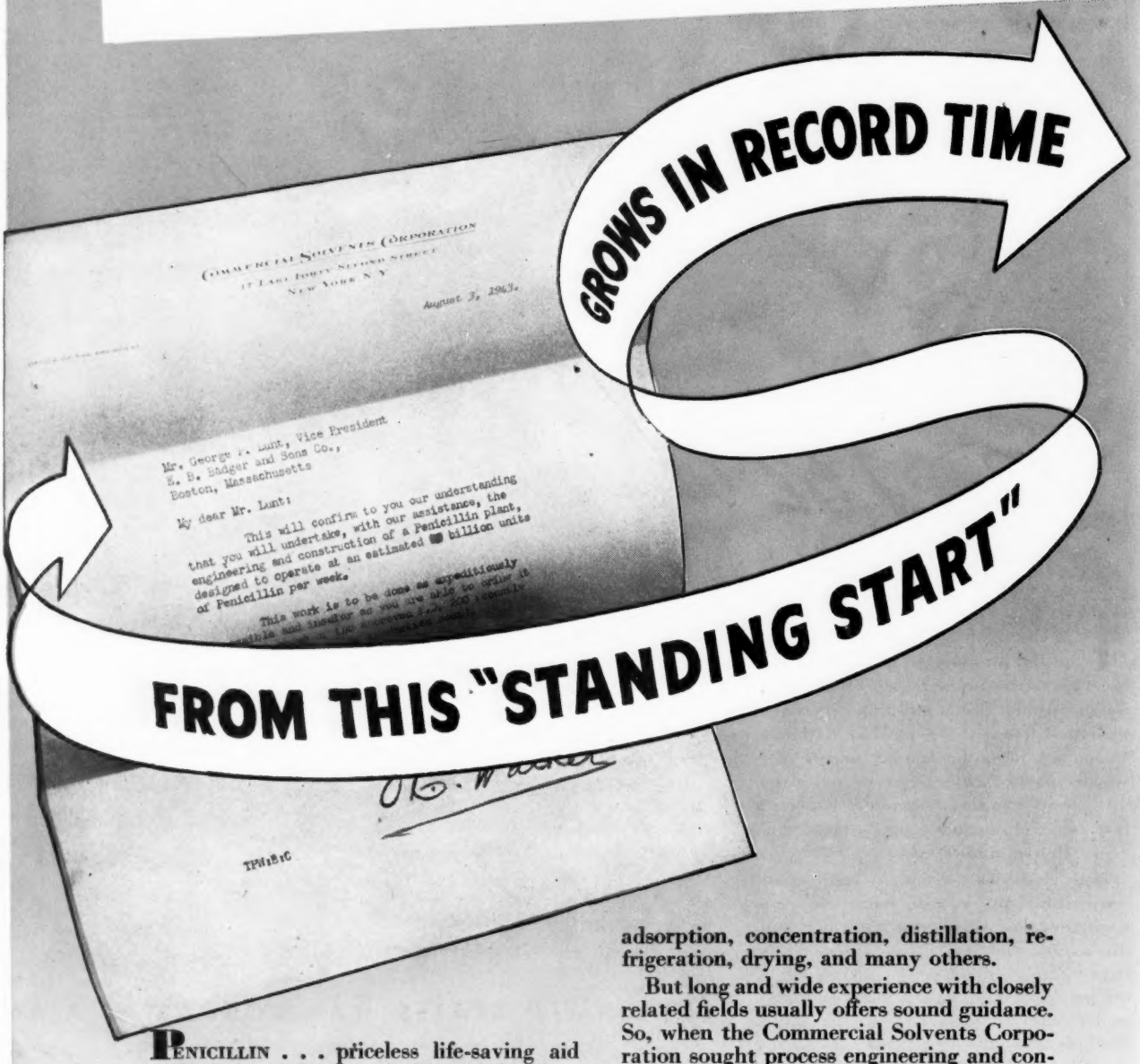
UCC

30 East 42nd Street, New York 17, N. Y.

PRODUCERS OF SYNTHETIC ORGANIC CHEMICALS

"Carbowax" is a registered trade-mark of Carbide and Carbon Chemicals Corporation.

WORLD'S LARGEST P

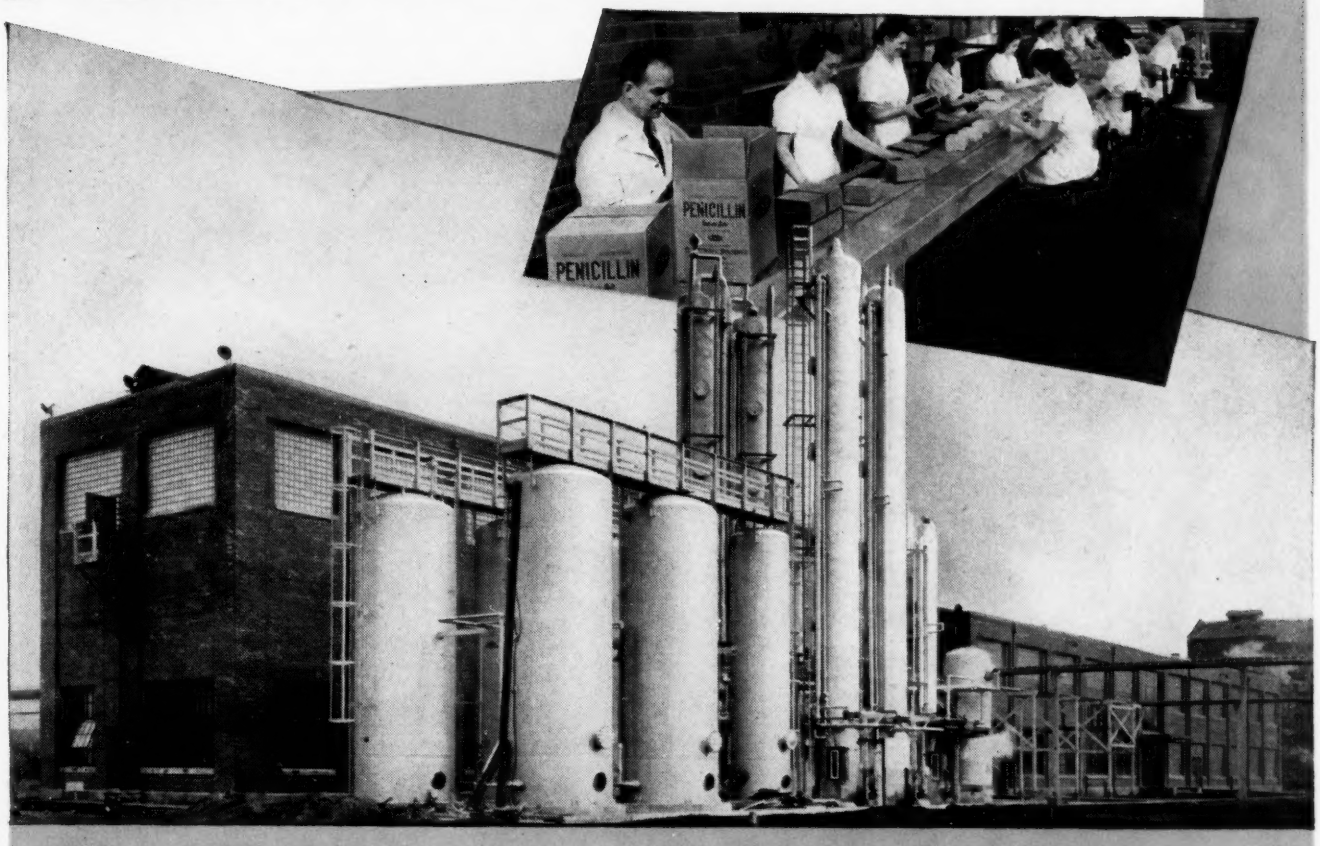

GROWS IN RECORD TIME
FROM THIS "STANDING START"
COMMERCIAL SOLVENTS CORPORATION
August 3, 1943.
Mr. George A. Lunt, Vice President
E. B. Badger and Sons Co.,
Boston, Massachusetts
My dear Mr. Lunt:
This will confirm to you our understanding that you will undertake, with our assistance, the engineering and construction of a Penicillin plant, designed to operate at an estimated [redacted] billion units of Penicillin per week.
This work is to be done as expeditiously

PENICILLIN . . . priceless life-saving aid to humanity! So new is this wonder drug that when war-emergency demanded large-scale production quickly, there was little precedent on which to base manufacturing requirements.

Never before in our experience were process engineers faced with such a variety of problems to be solved in so short a time—problems of extraction, filtration, adsorption, concentration, distillation, refrigeration, drying, and many others.

But long and wide experience with closely related fields usually offers sound guidance. So, when the Commercial Solvents Corporation sought process engineering and construction services for a plant "*designed to operate at an estimated* (censored) *billion units of Penicillin per week*," to be completed "*as expeditiously as possible*," it was the highly qualified Badger organization that was selected to handle the entire project in co-operation with the Research and Engineering Departments of Commercial Solvents Corporation.

PENICILLIN PLANT



This was the first large Penicillin plant to go into initial operation (January 31, 1944).

August 3, 1943 (see letter reproduced on opposite page), marked the "standing start," and from this there rose *WITHIN 180 DAYS* the complete plant you see pictured above!

Only through perfect co-ordination could the design and fabrication of the specialized equipment required for this plant be scheduled to meet so short a construction time.

Because Penicillin is a sensitive product, and its efficacy is dependent on many critical factors of production, this achievement, for speed and intricate details, completely overshadows the work of average chemical-plant designing and construction.

Among the hundreds of requisites, Badger provided equipment for manufacture under extreme sterility; for vacuum dehydration to 1/10,000th of atmospheric pressure; for constant refrigeration to prevent deterioration during manufacture, packaging, and on through to shipment; and even for the rabbit farm for testing and further development of the product.

It is the sum of diversified and cumulative experience in process engineering, equipment designing and plant construction that enables Badger to handle new and unusual projects of any size, anywhere in the world.

E. B. Badger & SONS CO., BOSTON—EST. 1841

NEW YORK • PHILADELPHIA • SAN FRANCISCO • LONDON

Process Engineers and Constructors for the Chemical, Petroleum and Petro-Chemical Industries

Continuous investigation and increased care in plant operation have resulted in great improvements in the quality standards of HARDESTY products. In the fatty acid field, production has advanced to a high degree of perfection in developing special types that are finding many new industrial uses.

This extensive research and the resultant development of HARDESTY fatty acids during the past few years have brought forth qualities and high purities not heretofore obtainable—fatty acids that are extremely light in color, free of contaminants, and each with unusual characteristics to meet the buyers' specifications. Consequently, these acids have created a huge demand by many industries using these newer fatty acids in their processes. Perhaps you have use for a fatty acid. Send for a sample today and explore the possibilities offered by HARDESTY quality products.

Stearic Acid
Red Oil • Glycerine
Hydrogenated Fatty Acids
Animal and Vegetable Distilled Fatty Acids
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PQ silicates—to the aid of paper mills

THERE may be aid here for you too. Research of a few years back is taking mills over the hump in the present paper shortage. The paper manufacturer turned to soluble silicates to help stretch his pulp, to increase his volume, to improve his quality. Some papermaking processes using the efficiency and economy of the silicates are described below.

De-inking: Fundamentally a detergent problem, hence our Metso Sodium Metasilicate ($Na_2SiO_3 \cdot 5H_2O$) with its quick wetting, effective dispersing and emulsifying powers renders cleaner, whiter pulp from waste paper stocks. One mill customer,* supplying a large publisher, uses 95% de-inked stock with only 5% of virgin pulp, producing a smooth-surface sheet with a high-quality feel.

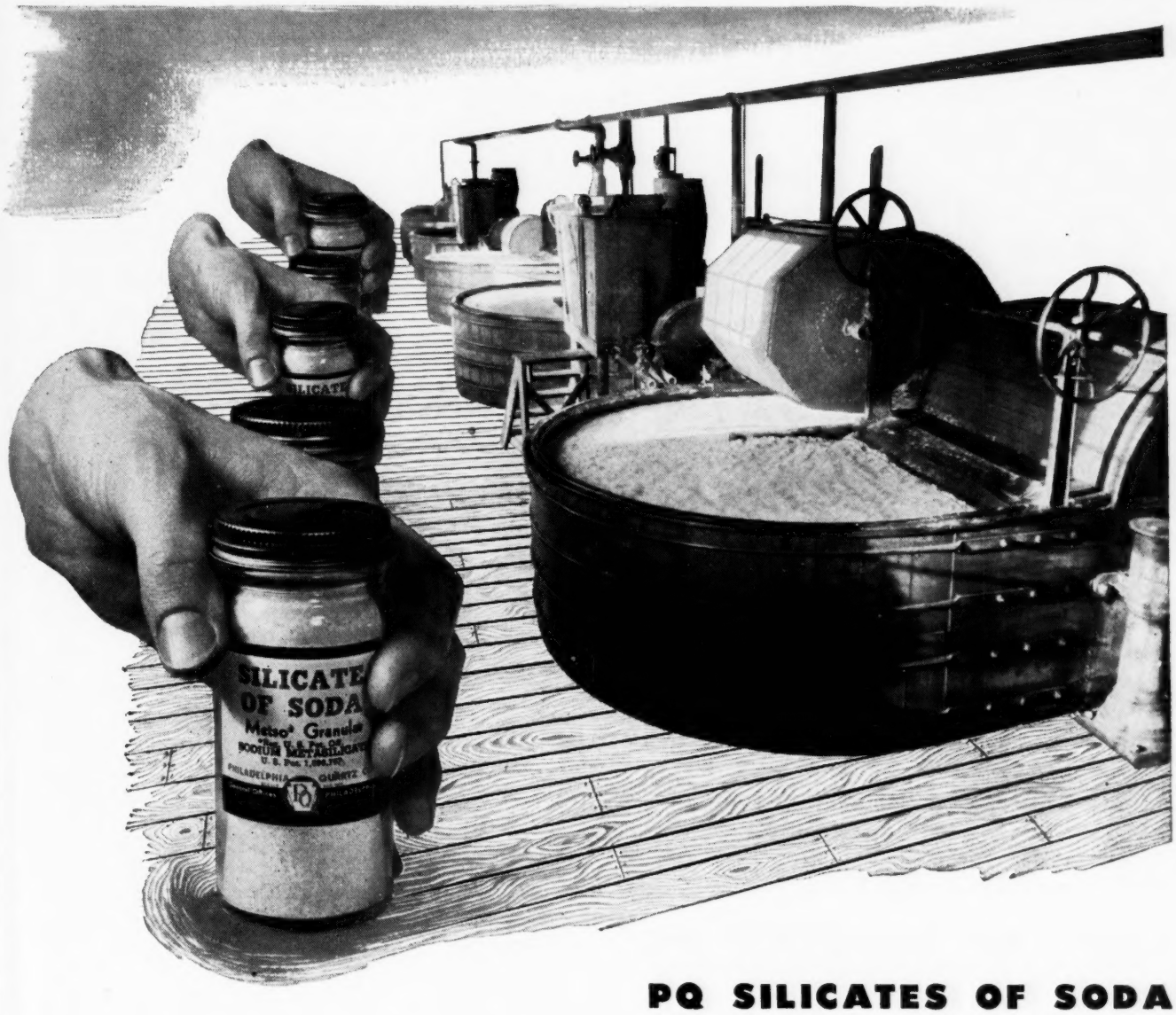
Rag Washing: Another operation that requires the detergent action of silicates. Metso takes out more of the colors with a minimum effect on fibre strength.

Paper Sizing: "S" Brand Silicate (Ratio 1:3.90) by chemical reaction with alum has long served as a fibre extender . . . it tucks in the short fibres and also increases retention of papermaking materials such as starch, clay, rosin.

PQ stands ready to help you solve a current problem involving a detergent or a precipitating action. Get complete PQ Silicate facts. *NAME ON REQUEST

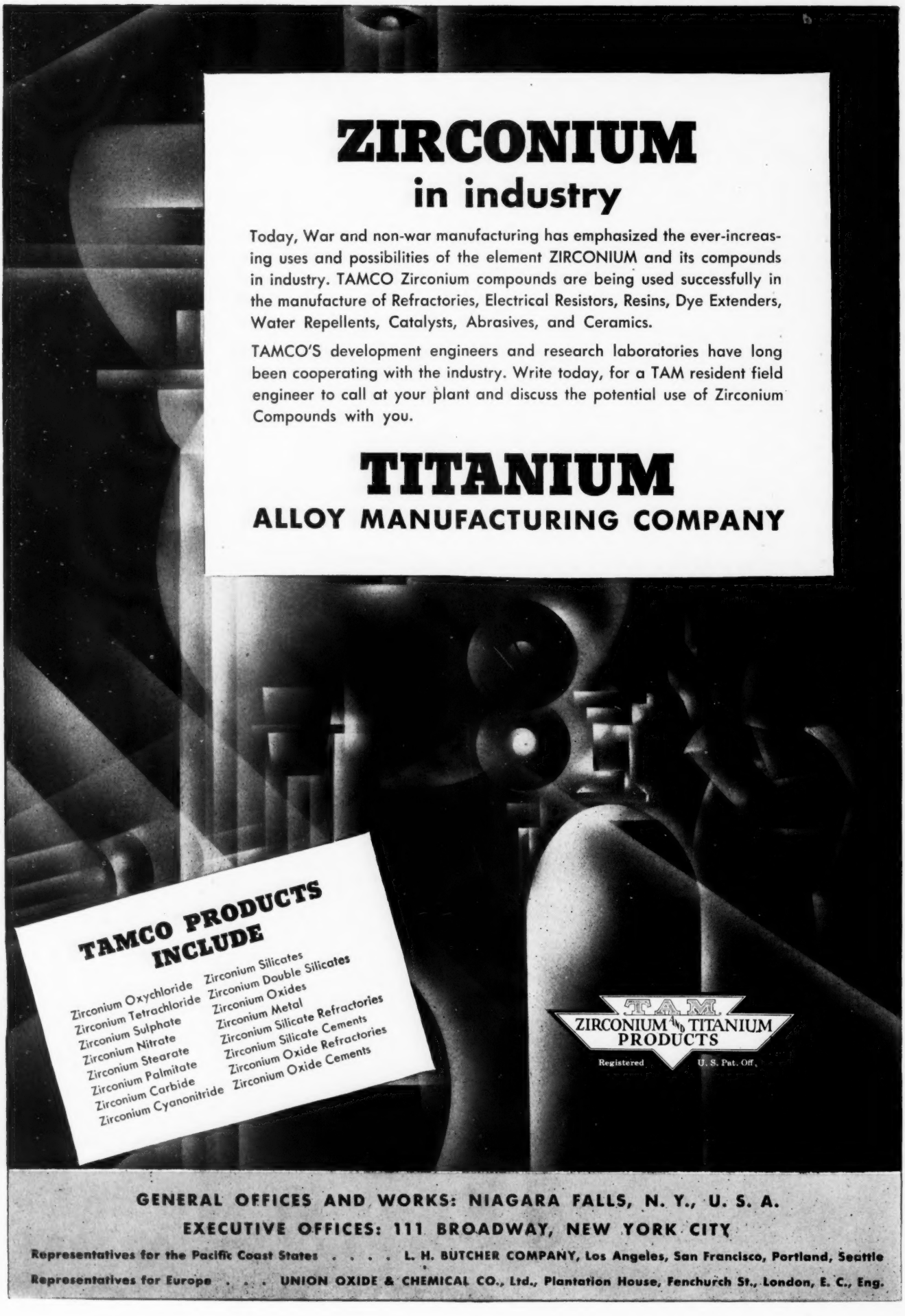
PHILADELPHIA QUARTZ CO.

Dept. B, 119 South Third Street, Phila. 6, Pa.
Chicago Sales Office: 205 West Wacker Drive



PQ SILICATES OF SODA

WORKS: Anderson, Ind. • Baltimore, Md. • Chester, Pa. • Gardenville, N. Y. • Jeffersonville, Ind. • Kansas City, Kans. • Rahway, N. J. • St. Louis, Mo. • Utica, Ill.


ZIRCONIUM
in industry
Today, War and non-war manufacturing has emphasized the ever-increasing uses and possibilities of the element ZIRCONIUM and its compounds in industry. TAMCO Zirconium compounds are being used successfully in the manufacture of Refractories, Electrical Resistors, Resins, Dye Extenders, Water Repellents, Catalysts, Abrasives, and Ceramics.
TAMCO'S development engineers and research laboratories have long been cooperating with the industry. Write today, for a TAM resident field engineer to call at your plant and discuss the potential use of Zirconium Compounds with you.
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ALLOY MANUFACTURING COMPANY
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Zirconium Sulphate
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Zirconium Stearate
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Zirconium Carbide
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Zirconium Silicates
Zirconium Double Silicates
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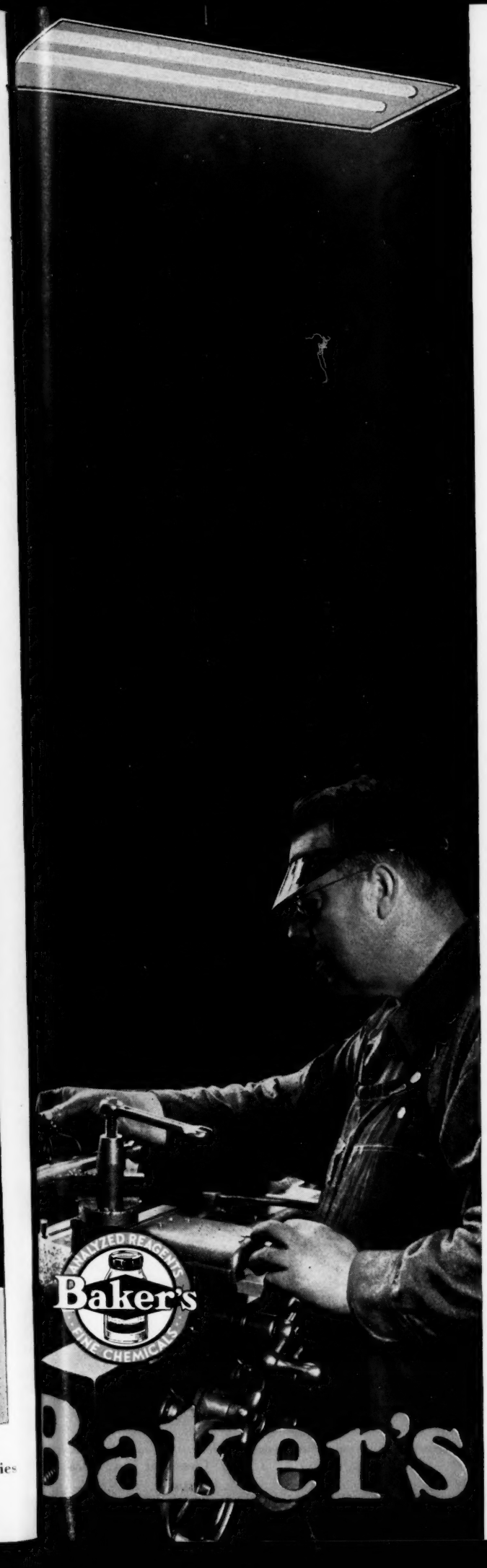

CHEMICAL PURITY

...helps industry speed up under FLUORESCENT LIGHTING

Cylinders of "daylight" opening up new realms in lighting! That's Fluorescent Lighting, one of the most brilliant scientific discoveries of recent years.

Under higher levels of illumination—in soft, cool, diffused light—workers in industry attain greater speed, finer precision. Errors are fewer. Eyes are less fatigued. Production steps up!

This modern miracle—Fluorescent Lighting—came only after years of research. Baker played its part in contributing chemicals of extraordinary purity to make possible the fluorescent substance used on the inner surface of the cylinder. Here, *purity was demanded*—so that clear, bright light might come through.

This is only one of many instances where *purity*, as exemplified by Baker Chemicals, has increased efficiency in today's forward march of industry.

Baker's Industrial Chemicals (purity by the ton) have been supplied to many manufacturing concerns for the manufacture or processing of many products. Some of these Baker Chemicals are the manufacturer's own special formula. In such cases, Baker manufactures these chemicals under code number, and the names of these chemicals never appear on the company's records. We do this as a protection to the customer.

If you have special chemical requirements (standard or special specifications), we invite you to discuss your needs in confidence with a Baker representative. For laboratory testing or for manufacturing, Baker Chemicals provide you with the dependable purity and uniformity so essential in safeguarding the quality of your products.

J. T. BAKER CHEMICAL CO., Phillipsburg, N. J.

NEW YORK	PHILADELPHIA	CHICAGO
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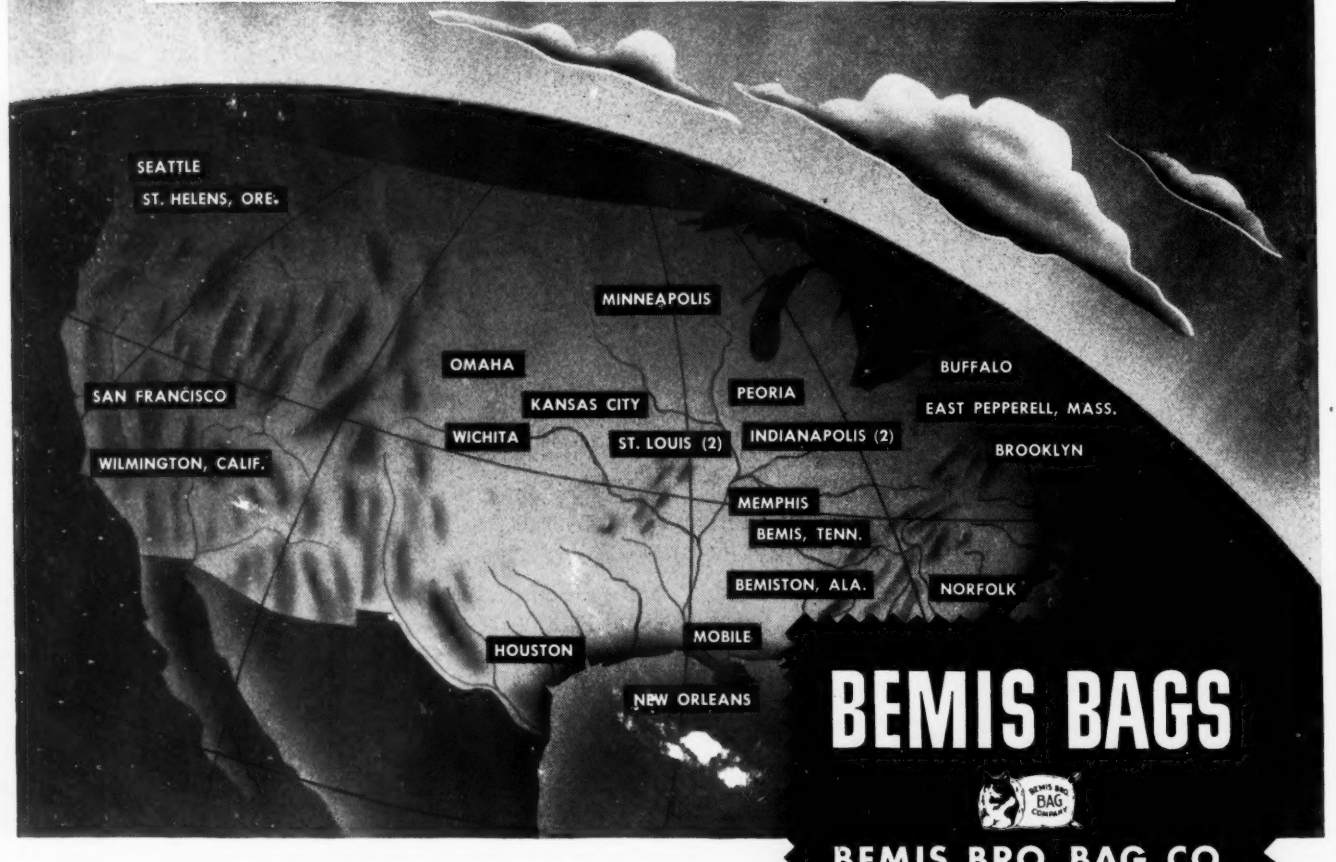
TWENTY-THREE BEMIS FACTORIES TO SERVE YOU

WARTIME restrictions and the tremendous movements of the many essential products that are shipped in bags naturally create a tight supply situation. It's a difficult problem to furnish all of the bags that are needed... just when they are needed.

That's why it pays to do business with a company like Bemis. Twenty-three factories across the country mean a lot of productive capacity . . . and they also mean convenience and the best possible service under any prevailing conditions. In short, we sincerely believe that today, as in normal times, you'll find Bemis Bro. Bag Co. your most versatile, most reliable source of supply.



BEMIS BAGS

BEMIS BRO. BAG CO.

OFFICES: Baltimore • Boston • Brooklyn • Buffalo • Charlotte Chicago • Denver • Detroit • East Pepperell • Houston • Indianapolis Kansas City • Los Angeles • Louisville • Memphis • Minneapolis Mobile • New Orleans • New York City • Norfolk • Oklahoma City Omaha • Peoria • St. Helens, Ore. • St. Louis • Salina • Salt Lake City San Francisco • Seattle • Wichita • Wilmington, Calif.

BETTER BAGS FOR 86 YEARS

Bemis makes Paper (both single and Multiwall), Waterproof, Deltaseal, Cotton and Burlap Bags for the Chemical Industry.

PENICILLIN
MERCK

A RECORD OF PERFORMANCE

THOROUGHGOING experience and established leadership in organic research, development, and production have been the determining factors in the rapid achievement of large-scale Penicillin production by Merck & Co., Inc.

Intensive research on Penicillin, begun in the autumn of 1940, established a sound basis for the successful development of mass production. By applying chemical engineering principles to the manufacture of this intrinsically unstable and difficultly produced substance, Merck & Co., Inc. succeeded in devising and perfecting a practical method of production, based on the mass-fermentation principle.

The following chronologic review tabulates the more important advances leading to the present volume of Penicillin production, including some of the contributions that we have been privileged to make:

1929—Penicillin discovered by Fleming in England.

1932—First report by British investigators confirming original work on Penicillin.

1940—First isolation of solid Penicillin by Oxford investigators.

1940—Merck research on antibiotics concentrated on Penicillin.

1941—First report of Penicillin's clinical value.

1941—Prof. H. W. Florey and Dr. N. G. Heatley, of the Oxford group, visited the United States to confer with interested Government officials and manufacturers, with the objective of establishing Penicillin production in America.

1941—Dr. Heatley, who participated in the first production work in England, remained at the Merck Research Laboratories to collaborate with Merck chemists in developing test and production procedures.

1941—Merck brought about a reciprocal arrangement between British and American investigators to spur production in cooperation with the United States and British governments.

1942—Merck supplied Penicillin for first case of bacteriemia successfully treated with Penicillin in America.

1942—Merck Penicillin was rushed under police escort to Boston for treatment of the Cocoanut Grove fire casualties.

1943—Merck sent supplies of Penicillin to England by air transport for urgent therapeutic use by the United States Army Medical Corps.

1943—Large-scale production of Penicillin was established by Merck to meet Government requirements.

1944—Merck sends ever-increasing supplies of Penicillin to our Armed Forces.

Merck & Co., Inc. will continue to surpass present production records, with the urgent objective of supplying adequate quantities of Penicillin for civilian use, as soon as the essential requirements of our Armed Forces have been fulfilled.

MERCK & CO., Inc. *Manufacturing Chemists* RAHWAY, N. J.

In Canada: Merck & Co., Ltd., Montreal and Toronto

An illustrated booklet describing the clinical uses of Penicillin Merck is available on request.

U-BOAT DEUTSCHLAND ARRIVES WITH CARGO OF DYESTUFFS AND CHEMICALS

German Submarine Unarmed— Declared to be 'Trader', No Man of War; No Internmen Planned, Says Sect'y Lansin

BALTIMORE, JULY 10, 1916 – Out of the mists in Chesape Bay late last evening, the large German submarine Deutschl docked this morning with a cargo of precious dyestuffs and in mediate chemicals vitally needed by American textile mills. first "underseas delivery" of a commercial cargo incl des some tons of essential dyes as well as other valuabl

One of the few existing news photos of the Deutschland arriving in Baltimore Harbor on July 10, 1916.

Though the Germans intended to show they could run the British blockade, actually the voyage dramatized the need for a self-sufficient American dyestuffs industry. Contrast the importance of 500 tons of dyestuffs then, with the availability of dyestuffs today in the midst of an infinitely larger global war.

That Didn't Repeat

It took a world war to free America from its dependence upon dyestuff imports. In fact, the greatest economic gain of World War I was the development of the American chemical and dyestuffs industry.

Today our dyestuffs industry is providing an ample supply of fast dyes for every military and essential civilian need.

This despite the unprecedented need for military textiles to clothe an army already four times larger than the A.E.F. of 1917-18. This despite unexpected demands of Lend Lease . . . and the unrationed desires of a civilian population grown a third larger with a cash income three times greater!

As a leading producer of dyestuffs, intermediates and synthetic organic chemicals, National is proud of its part in the industry's unprecedented growth.

NATIONAL ANILINE DIVISION

ALLIED CHEMICAL & DYE CORPORATION

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New and more extensive uses for plastics develop each day. Technical knowledge of fabrics and facilities for textile research may be of importance in your development, and our textile engineers are prepared to render a valuable service.

Our normal line includes some 25,000 different fabrics. Many of these are of special interest to those who manufacture plastics or are working on a product for which a fabric base is required. A few of the fabrics of interest to plastic manufacturers are shown here. They indicate the wide range available.

We represent eighteen mills and maintain the finest textile research laboratories. Our technical staff is constantly working on the development of new fabrics for special purposes. We shall be glad to study your individual needs in order to provide the proper fabric for any specific product.

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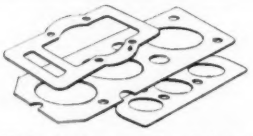
Consult the **UBS** *Laboratories on special Bonding, Coating and Impregnating Problems!*

No matter what the problem may be — *bonding neoprene, rubber and other coated or moulded parts to any ferrous or non ferrous metal; corrosion proofing chemical tanks and equipment; laminating leather belting; coating magneto parts; combining or coating fabrics; impregnating paper; cementing various materials together; insulating wire and other articles; etc.* — you will find the UBS Laboratories equipped to provide the one best formula to suit your needs. Longtime specialists in the field of industrial Bonding, Coating, and Impregnating Compounds, the UBS Laboratories not only know thoroughly the compounding advantages and limitations of all the latest synthetics, but even have developed an original synthetic latex and synthetic rubber of their own. *Write today, describing your Bonding, Coating, or Impregnating Problems.*

UBS developed adhesives are being used in the manufacture of inflatable Army and Navy Equipment, where weather and chemical resistant seams of high tensile strength are required.



UBS developed compounds are being successfully used to coat magneto parts and for cementing gaskets, where oil resistance is of great importance.

UBS developed adhesives and coating compounds are being widely used on Army delousing bags, protective clothing, etc., where acid resistance and flame resistance are of paramount importance.

UBS developed compounds are being used for chemical tank linings and to corrosion proof chemical handling equipment, where acid resistance and alkali resistance are primary factors.

Address all inquiries to the Union Bay State Chemical Company, Rubber Chemicals Division, 50 Harvard Street, Cambridge 42, Massachusetts.

UBS

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Chemical Company

Serving Industry with Creative Chemistry

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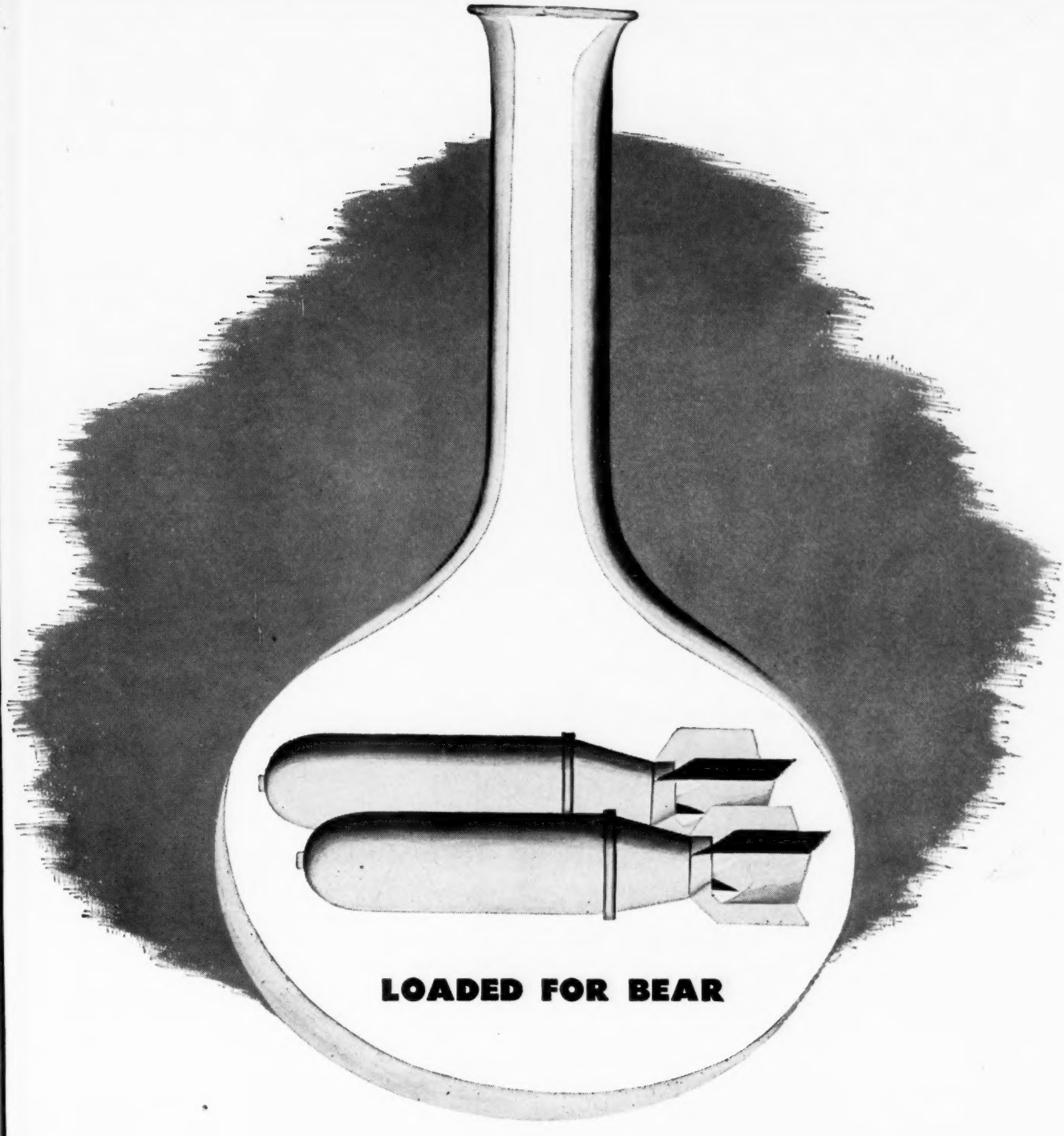
PLASTICS · INDUSTRIAL ADHESIVES · DISPERSIONS
COATING COMPOUNDS · IMPREGNATING MATERIALS · COMBINING CEMENTS



Without the part played in their creation by Industrial Chemistry, the weapons of Victory would be empty of meaning. Wyandotte Chemicals Corporation has a role in helping forge such vital weapons, through its resources, endless research and other technical activities.

Wyandotte
REG. U. S. PAT. OFF.
OFFICES IN PRINCIPAL CITIES

WYANDOTTE CHEMICALS CORPORATION—Michigan Alkali Division • Wyandotte, Michigan

Caustic Soda • Calcium Chloride • Soda Ash • Chlorine • Dry Ice • Bicarbonate of Soda • Calcium Carbonate • Aromatic Intermediates • Hydrogen

Here's a logical Refractory Plan—

YOU know the problems of petroleum and chemical engineers. As Refractories Engineers we know the answers to many refractory problems. On encountering such a problem it is only logical that petroleum and chemical engineers consult with the Refractories Engineer. When you have an application which involves the use of refractories consider the properties of those products by Carborundum included in the tabulation below or—better still—write to us for a mutual consideration of your problem.

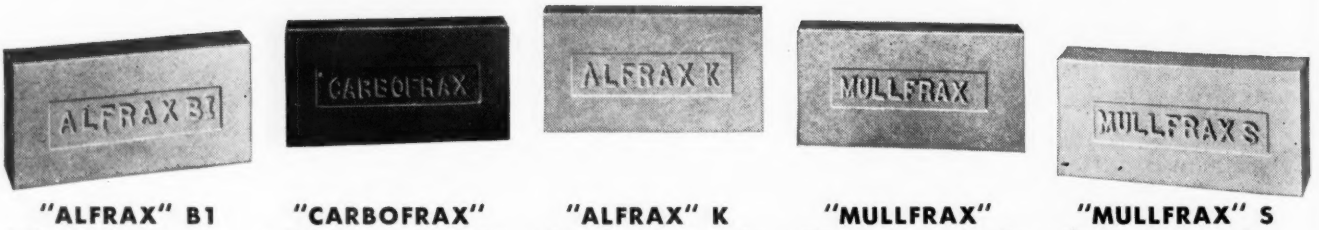
SUGGESTED APPLICATIONS

Boiler settings
Broad coke ovens
Chemical process furnaces
Heat treating furnaces
Laboratory furnaces
Muffle roasters
Oil refining stills
Recuperators
Hydrocarbon cracking regenerators
Reheating furnaces
Retorts
Rotary kilns
Muriatic acid furnaces

★ ★ ★

The chart below gives you a quick summary of the characteristics of five super refractories by Carborundum which are doing a big job on the war production front. Each of these super refractories is made in many modified compositions providing a wide range of physical properties.

The Carborundum Company, Refractory Division, Perth Amboy, N. J.



"ALFRAX" B1

1. Heat Conductivity, 7 Btu.
2. Refractoriness, PCE Cone 38
3. Good Spalling Resistance
4. Low Abrasion Resistance
5. Medium Thermal Expansion
6. Specific Heat, 0.320
7. Weight, 9-in. Straight 4.5 lb.

"CARBOFRAX"

1. Heat Conductivity, 109 Btu.
2. Refractoriness, PCE Cone 37-40
3. High Spalling Resistance
4. High Abrasion Resistance
5. Low Thermal Expansion
6. Specific Heat, 0.285
7. Weight, 9-in. Straight, 9.25 lb.

"ALFRAX" K

1. Heat Conductivity, 21 Btu.
2. Refractoriness, PCE Cone 37-39
3. Medium Spalling Resistance
4. High Abrasion Resistance
5. Medium Thermal Expansion
6. Specific Heat, 0.330
7. Weight, 9-in. Straight, 10.1 lb.

"MULLFRAX"

1. Heat Conductivity, 15 Btu.
2. Refractoriness, PCE Cone 38-39
3. High Spalling Resistance
4. Medium Abrasion Resistance
5. Medium Thermal Expansion
6. Weight, 9-in. Straight, 9.5 lb.

"MULLFRAX" S

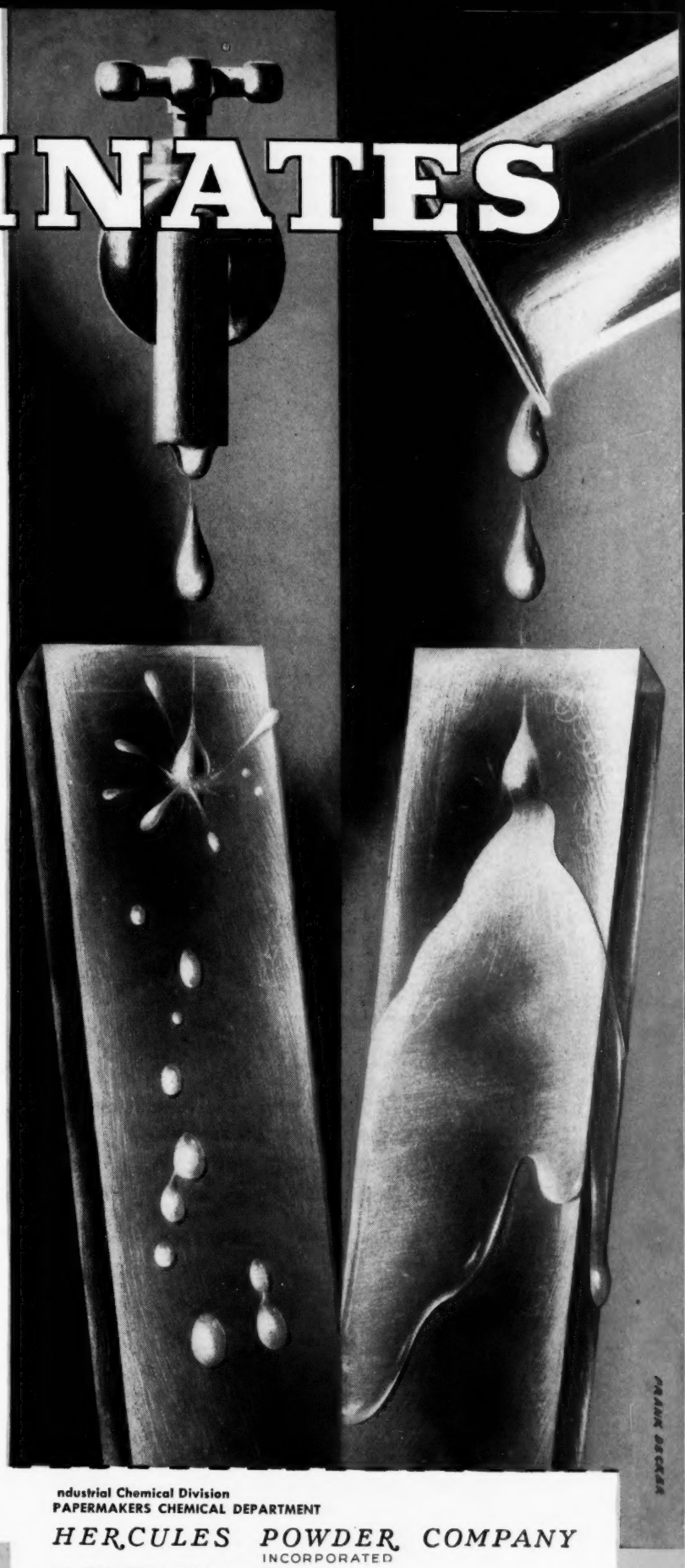
1. Heat Conductivity, 7 Btu.
2. Refractoriness, PCE Cone 37-38
3. High Spalling Resistance
4. Medium Abrasion Resistance
5. Medium Thermal Expansion
6. Weight, 9-in. Straight, 7.8 lb.

Super Refractories by CARBORUNDUM TRADE MARK

(Carborundum, Carbofrax, Mullfrax and Alfrax are registered trade marks of and indicate manufacture by The Carborundum Company)

*DRESINATES

FOR LOW COST WETTING, EMULSIFYING, DISPERSING ACTION



For surface-active and wetting action at low cost, industry is turning to Dresinates*—Hercules' new group of neutral, soluble resinates.

In printing inks, for example, Dresinates wet pigments and keep these pigments effectively dispersed. Dresinates are useful, too, as wetting agents for graphite, powdered coal, and other hard-to-wet materials.

Dresinates' combination of wetting ability, emulsifying ability, dispersing ability, and economy are filling important needs for many industries. In your operations, too, these low-cost materials may help save time, labor, equipment. For technical information, mail in the coupon below.

DRESINATES*—the neutral sodium and potassium salts of modified rosins—are cutting costs, speeding operations, and improving products in many industries.

AS EMULSIFIERS . . . in cutting oils, drawing compounds, paint emulsions, asphalt emulsions, pine oil disinfectants.

AS DETERGENT-ASSISTANTS . . . in soaps, laundries, alkaline metal cleaners, textile processing, floor-cleaning compounds.

AS WATERPROOFING AND PLASTICIZING AGENTS . . . in starch and glue adhesives.

*Reg. U. S. Pat. Off.

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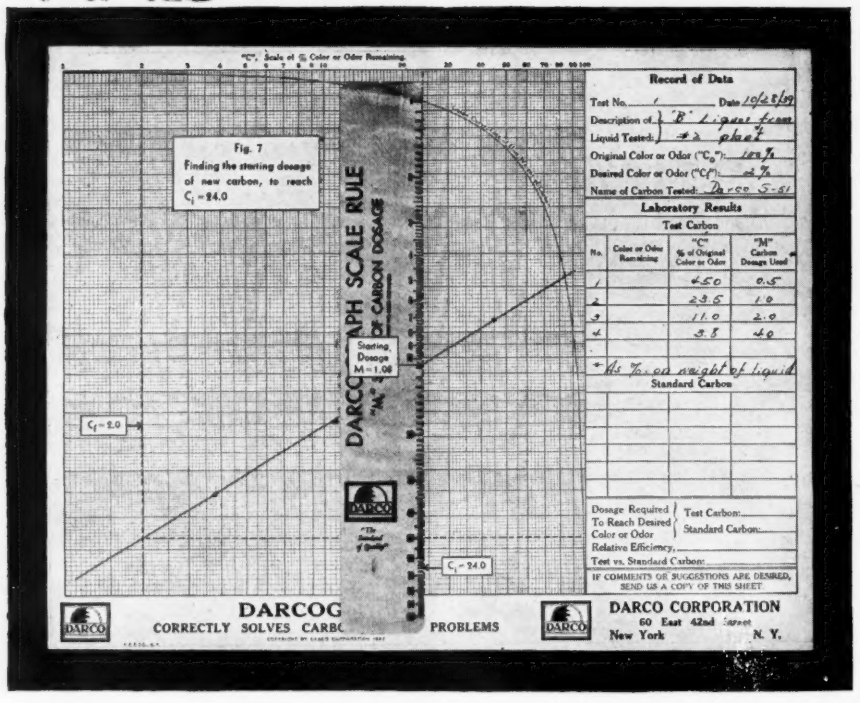
Fig. 7
Finding the starting dosage of new carbon, to reach C_f = 24.0
DARCOGRAPH SCALE RULE
"M" = DOSAGE OF CARBON
Starting Dosage, M = 1.08
C_f = 2.0
C_f = 24.0
Record of Data
Test No. 1 Date 10/28/59
Description of Liquid Tested: "B" Liquor from #2 plant
Original Color or Odor (C_o): 100%
Desired Color or Odor (C_f): 24%
Name of Carbon Tested: Darco S-51
Laboratory Results
Test Carbon
No. | Color or Odor Remaining | "C" % of Original Color or Odor | "M" Carbon Dosage Used*
1 | | 45.0 | 0.5
2 | | 23.5 | 1.0
3 | | 11.0 | 2.0
4 | | 3.5 | 4.0
* lbs. Tes. on weight of liquid
Standard Carbon
Dosage Required To Reach Desired Color or Odor
Test Carbon:
Standard Carbon:
Relative Efficiency,
Test vs. Standard Carbon:
IF COMMENTS OR SUGGESTIONS ARE DESIRED, SEND US A COPY OF THIS SHEET.
DARCOG
CORRECTLY SOLVES CARB
PROBLEMS
DARCO CORPORATION
60 East 42nd Street
New York N. Y.

The Darcograph makes it easy to tell precisely how much Darco activated carbon will purify any given amount of liquid.

for PRECISION PURITY!

Purification problems vary. Different impurities occur in different solutions, organic and inorganic. Don't worry—if you've struck a tough one. Try using Darco activated carbon, added in amounts predetermined by the Darcograph. In one easy operation, you accomplish two important jobs:

1. ***Swift, complete removal of impurities.***
2. ***More efficient crystallization, evaporation or distillation,*** *since impurities no longer impede processing.*

Precision purity, in our dictionary, is simply this double-duty performance by Darco—used according to the Darcograph. It costs little, since a pound of activated carbon will purify many gallons of process liquid. It's easily applied. *The results are big:* Higher returns of a more saleable product. Savings in man-hours and materials. More profitable processing.

Try using the Darcograph yourself. See how the billions of adsorptive particles in a pound of Darco take out unwanted colors, odors, gums, greases, colloids and other undesirables. You'll probably save a lot of time—and do a real job of precision purification—if you'll consult us immediately. We'll be glad to send you a Darcograph, without charge.

DARCO
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DARCO—REG. U. S. PAT. OFF.

DARCO CORPORATION

60 East 42nd Street, New York 17, N.Y.

Chemicals FOR AMERICA'S WAR ARSENAL

A preponderance of Stauffer Industrial Chemicals is being consumed in the manufacture of ammunition, guns, planes, ships and other war equipment. Our plants are working "around the clock" to supply the necessary quantity . . . and quality of the essential chemicals for America's war arsenal.

Since its inception in 1885, Stauffer has gone through every war, concentrating its efforts on the full utilization of its resources, extending its facilities to the limit to help America win.

Stauffer CHEMICALS SINCE 1885

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Caustic Soda
Citric Acid
*Copperas
Cream of Tartar
Liquid Chlorine
Muriatic Acid
Nitric Acid
Silicon Tetrachloride
Sodium Hydrosulphide
Stripper, Textile
Sulphur
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*Superphosphate
Tartar Emetic
Tartaric Acid
Titanium Tetrachloride

*(*Items marked with star are sold on West Coast only.)*

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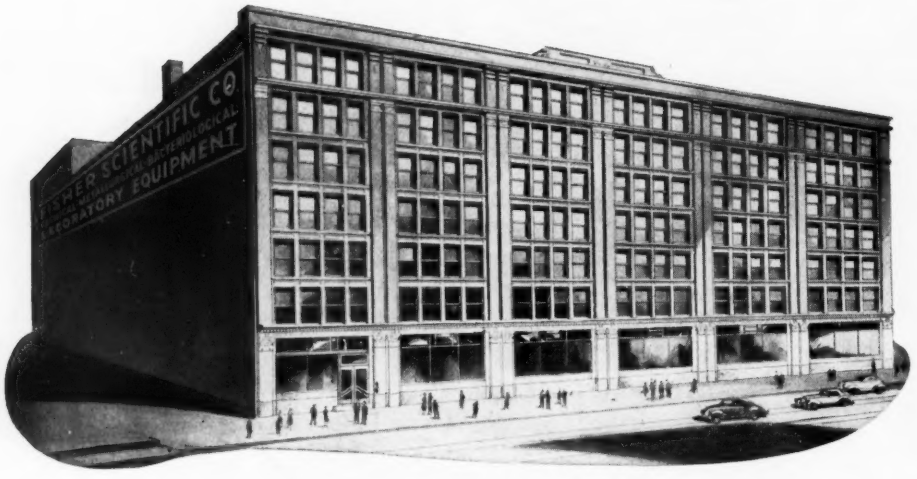

The Fisher Scientific Company is devoted exclusively to the design, manufacture and supply of modern laboratory appliances.

Large stocks of laboratory apparatus and reagent chemicals are on hand at Fisher Scientific Company in Pittsburgh and at Eimer and Amend in New York. Laboratory requirements can be obtained from either plant, whichever is more convenient.

Eimer and Amend's new plant, with its instrument shops, glassblowing shops and chemical manufacturing laboratories, is the modernized continuation of America's Pioneer Laboratory Supply House.

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The new and tougher types of synthetic rubber insulating materials are now in the service of both the Armed Forces and industry. Sharples Organic Chemicals are essential to their formulation and production, just as they serve many other industries producing war materiel—industries which tomorrow will call upon Sharples Research to assist in the extensive rehabilitation program called for by a world at peace.

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o-AMYL PHENOL
DIAMYL PHENOL
AMYLAMINES
BUTYLAMINES
ETHYLAMINES
DIETHYLAMINOETHANOL
DIBUTYLAMINOETHANOL
ETHYL ETHANOLAMINES
BUTYL ETHANOLAMINES
ETHYL ANILINE
DICHLORO PENTANES
AMYL NAPHTHALENES
AMYL BENZENES
MIXED AMYL CHLORIDES
DIAMYL SULFIDE
n-BUTYL CHLORIDE
MIXED AMYLENES

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PLANT: WYANDOTTE, MICH.

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SHARPLES TRADE MARK CHEMICALS

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THESE PRODUCTS are stable, rapid, penetrating fluids, quick and efficient extraction agents. They mix readily with each other and with benzol, petroleum distillates, alcohol, acetone and many other organic solvents. Each chlorohydrocarbon in this series has a definite boiling point, the lowest in the series boiling at 39.3°C. and the highest at 161.9°C., a range not approached by any other related group of non-flammable or moderately flammable solvents.

THE NON-FLAMMABLE NATURE, selective solvent power and stability of the Du Pont Chlorinated Solvents offer excellent possibilities for many types of industrial work. All are powerful solvents which, for many applications, have already found a place in modern industry.

SELECTIVE SOLVENT ACTION—These solvents readily dissolve oils, fats, waxes, tars, natural resins, free alkaloids and are miscible with alcohol, ether and other ordinary organic solvents. Sugars, alkaloid salts, ordinary plant acids, and water are insoluble or practically insoluble in these solvents.

EASY RECOVERY—They can be removed readily and economically without decomposition from extracted residues by distillation or filtration.

APPLICATIONS AND USES

METAL DEGREASING—Trichlorethylene and, to some extent, perchlorethylene are used in specially designed and constructed equipment for vapor degreasing of metals. Among the many factors leading to the selection of trichlorethylene for hot solvent degreasing are non-flammability, low latent heat, ideal boiling point, low solvent loss under conditions of use, and high stability even in the presence of water. Du Pont solvents for metal degreasing are supplied nationally through distributors. Consult our district offices for information about nearest source of supply and availability.

DRY CLEANING—Trichlorethylene, perchlorethylene and carbon tetrachloride are in common use as dry cleaning solvents.

EXTRACTION—Most of the chlorinated hydrocarbons find use in the extraction field, the selection of the solvent depending upon many factors such as solubility of the material being extracted, cost, flammability, stability, and nature of extraction process. Some important examples are methylene chloride for cocoa butter; chloroform for medicinals, carbon tetrachloride for oils and fats from substantially dry materials; trichlorethylene for soy bean oil and alkaloids. Methylene chloride is particularly suited for low-temperature extraction of materials such as essential oils and edible fats which are adversely affected by higher temperatures. Like trichlorethylene, it has sufficiently high stability in the presence of water to permit its complete removal from extracted oils by steam distillation.

MISCELLANEOUS USES

Methyl chloride is used as a refrigerant and as a low boiling solvent. Methylene chloride has excellent oil dewaxing properties. It is a highly efficient paint remover and is particularly valuable for this purpose because of its non-flammability. Chloroform is being utilized in vitamin and penicillin manufacture. Carbon tetrachloride finds wide use as a spotting solvent and also for small-scale cold cleaning of metals. Trichlorethylene is used for spotting, paint removal, wool degreasing and oil dewaxing. Perchlorethylene is used as a rubber solvent, and ethyl chloride for low-temperature extraction. Tetrachlorethane and pentachlorethane find use as chemical intermediates and in special solvent applications.

★ ★ ★

At present, supplies of these solvents have been allocated or restricted to military or essential civilian uses. Small quantities are available, however, for research and development purposes. Write for complete data. E. I. du Pont de Nemours & Co. (Inc.), Electrochemicals Department, Wilmington 98, Delaware.

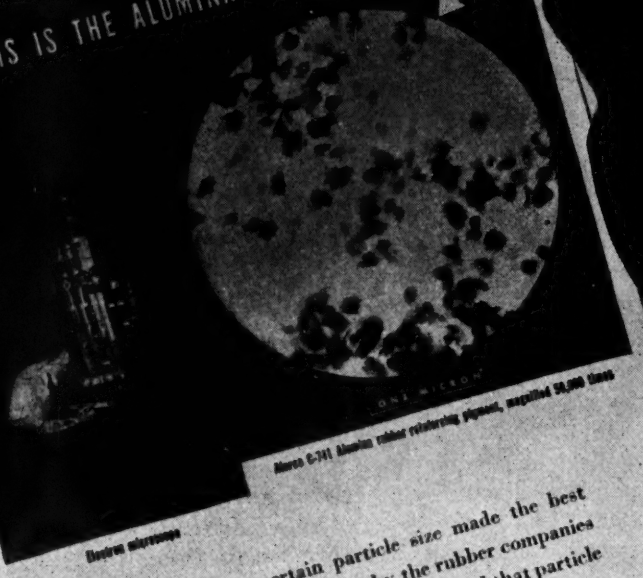
DU PONT ELECTROCHEMICALS

DU PONT

REG. U.S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING . . . *THROUGH CHEMISTRY*

"Fine!" SAID THE RUBBER MAKERS,
AND THIS IS THE ALUMINA WE GAVE THEM



Alorco C-741 Alumina rubber reinforcing pigment, magnified 50,000 times

Electron microscope

C-741 Alumina of a certain particle size made the best rubber reinforcing pigment; tests by the rubber companies proved this. The electron microscope identified that particle size. Standards were established. Today, this microscope serves as a control on production, and the rubber companies are assured of a uniformly fine reinforcing pigment, when they employ Aluminum Ore Company's C-741 Alumina. Paper coatings, pigments and fillers for rubber, paint, plastics, inks; these are but a few of the uses on which Aluminas in the C-700 series were tried successfully before the war. Alorco's ability to vary the properties of these versatile materials offers unlimited possibilities as you make plans for improving your postwar products.

Tell us what you want an Alumina to accomplish. Or, if you're not ready to talk about it, list the characteristics it should have. Quite likely, a material is already available—we'll send you samples for trial. ALUMINUM COMPANY OF AMERICA (Sales *Agent for* ALUMINUM ORE COMPANY) 1935 Gulf Building, Pittsburgh, Penna.

ALUMINUM ORE COMPANY

Aluminum and Fluorine Compounds

ALOREO

HERE'S ANOTHER CASE SHOWING HOW AND WHY MANUFACTURERS USE THE RCA ELECTRON MICROSCOPE AND ENTHUSE ABOUT IT!

TODAY more and more industrial production and research executives realize more keenly than ever before that particle size, shape and surface characteristics may exert a vital effect on the *quality*, *cost* and *performance* of their products.

Development of the RCA Electron Microscope has made it possible for such executives and technicians to see, study and sharply photograph particles far too small to be observed with any ordinary microscope.

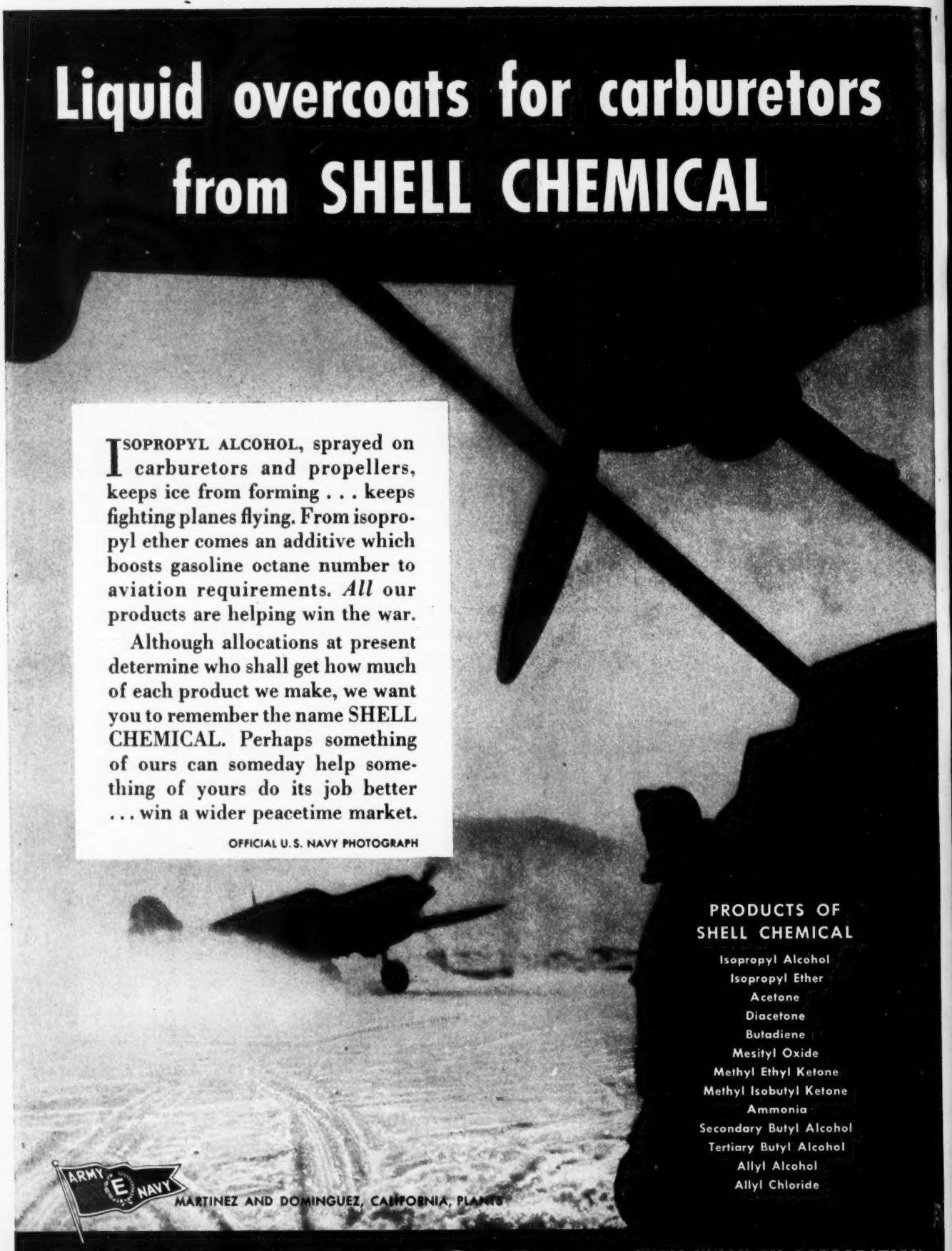
In the laboratories and plants of many leading industrial and scientific organizations the RCA Electron Microscope now provides the means by which the cause of many product failures . . . and the key to many product improvements and controls . . . are being determined and checked. An excellent example of this trend is cited in the advertisement reproduced above.

For information regarding the RCA Electron Microscope please address your inquiry to Electron Microscope Section, RADIO CORPORATION OF AMERICA, *Camden, New Jersey.*

RCA

RADIO CORPORATION OF AMERICA

Liquid overcoats for carburetors from SHELL CHEMICAL



ISOPROPYL ALCOHOL, sprayed on carburetors and propellers, keeps ice from forming . . . keeps fighting planes flying. From isopropyl ether comes an additive which boosts gasoline octane number to aviation requirements. *All* our products are helping win the war.

Although allocations at present determine who shall get how much of each product we make, we want you to remember the name SHELL CHEMICAL. Perhaps something of ours can someday help something of yours do its job better . . . win a wider peacetime market.

OFFICIAL U.S. NAVY PHOTOGRAPH

PRODUCTS OF SHELL CHEMICAL

Isopropyl Alcohol
Isopropyl Ether
Acetone
Diacetone
Butadiene
Mesityl Oxide
Methyl Ethyl Ketone
Methyl Isobutyl Ketone
Ammonia
Secondary Butyl Alcohol
Tertiary Butyl Alcohol
Allyl Alcohol
Allyl Chloride

ARMY E NAVY

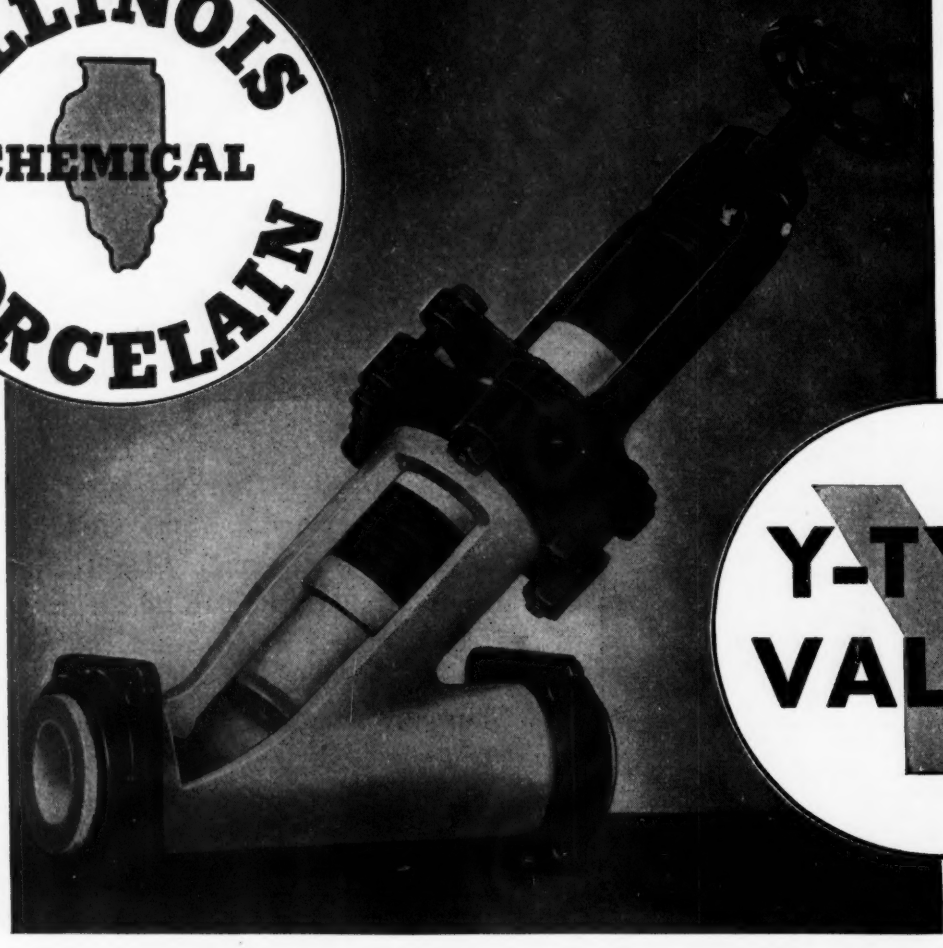
MARTINEZ AND DOMINGUEZ, CALIFORNIA, PLANTS

SHELL CHEMICAL *Division of* SHELL UNION OIL CORPORATION
100 BUSH ST., SAN FRANCISCO 6, CALIFORNIA

R. W. GREEFF & CO. *Eastern Sales Agent* 10 ROCKEFELLER PLAZA, NEW YORK 20. TRIBUNE TOWER, CHICAGO 11

Diamond
Research Chemists and Development Engineers cooperate in the perfection of Diamond Products to meet industry's ever-changing requirements.
Through close teamwork of our field and development engineers, research chemists and manufacturing personnel, DIAMOND coordinates a variety of specialized technical skills in perfecting the service rendered to users of Diamond Products.
Thus any change in your requirements can be quickly and accurately provided through the close cooperation of the Diamond personnel and facilities.
ALKALI
DIAMOND ALKALI COMPANY
Pittsburgh, Pa., and Everywhere . . .

ILLINOIS CHEMICAL PORCELAIN



Y-TYPE VALVES

PORCELAIN ADDS LONGER LIFE TO INSTALLATIONS . . . . .

The valve seat is located in lowest possible position so that you get uninterrupted flow of material when stem is in open position. Packing is acid-resisting asbestos—graphite impregnated. Ends of valve are ground parallel for gasketing. All valves are tested 100 lbs. hydraulic pressure.

ILLINOIS Porcelain Y-Type Valves are easy to operate. They can be used for most acid- and chemical-handling requirements.

• *Send for our latest catalog.*

NON-CORROSIVE NON-ABSORBENT

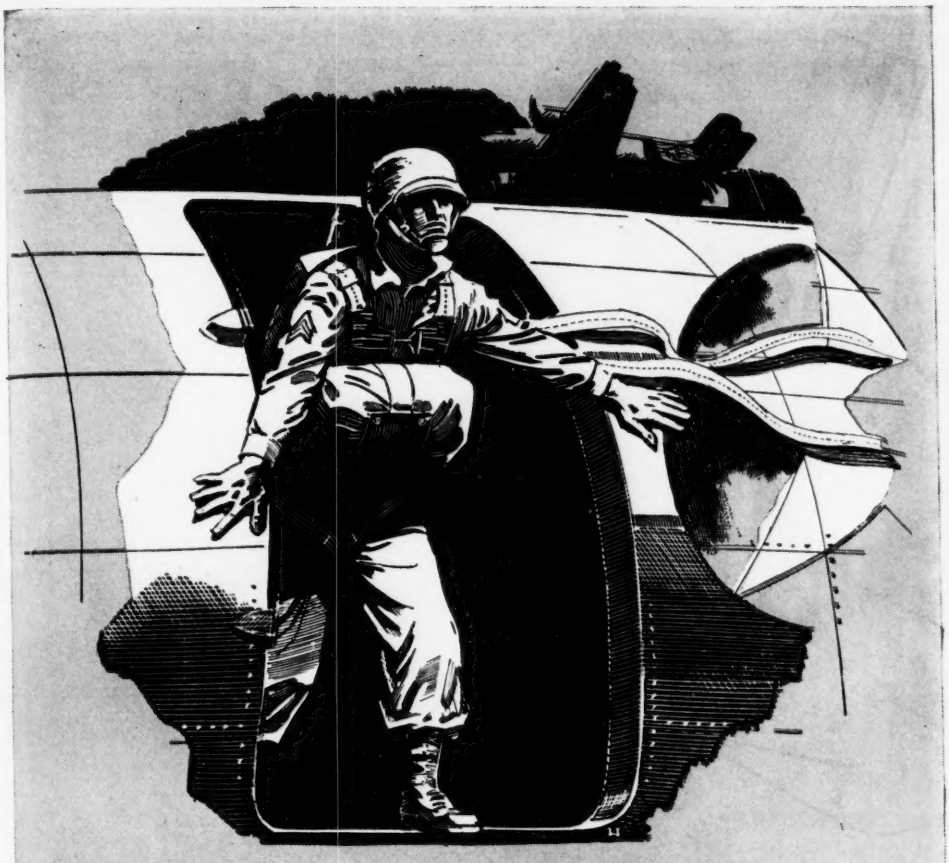
PORCELAIN SAVES CRITICAL MATERIALS

ALL VALVE SEATS ARE PORCELAIN TO PORCELAIN

NO ELECTROLYTIC ACTION IS POSSIBLE

ILLINOIS ELECTRIC PORCELAIN COMPANY

MACOMB, ILLINOIS



It *must* be right

Now it's the real thing. Months of training and severe conditioning are past. The attack has been planned in minute detail, he is equipped for every contingency. At the signal, he leaps into the swift airstream . . .

Safe on the ground, the Parachutist moves ahead toward his objective. But of all the factors contributing to the success of the attack—rigorous training, careful planning, perfect timing—none is more important than the comparatively routine task of packing his parachute.

The use of Columbia chemicals has become routine in some processes, but their importance to smooth production and high product standards has not lessened. Columbia chemicals *must* be right. This is why Columbia is exacting in its methods . . . why it invariably satisfies its customers.

COLUMBIA CHEMICALS

PITTSBURGH PLATE GLASS COMPANY
COLUMBIA CHEMICAL DIVISION
GRANT BUILDING • PITTSBURGH 19, PA.

CHICAGO • • • BOSTON • • • ST. LOUIS • • • PITTSBURGH • • • NEW YORK • • • CINCINNATI
CLEVELAND • • • MINNEAPOLIS • • • PHILADELPHIA • • • CHARLOTTE

COLUMBIA SPOTLIGHT

THE IMPORTANCE of electricity in the modern manufacture of alkalis and related chemicals is shown in the requirements for the operation of Columbia's plants. They are truly amazing when translated into terms of normal residential use. Based on 1943 records of the power industry, Columbia's consumption of electricity is sufficient to serve over 590,000 homes—the residential needs of a city the size of Milwaukee!

HOW WOULD YOU LIKE to be limited to two hot baths per year—Christmas and Easter—as are the people of Sweden's cities? Although this is the result of an acute fuel shortage, soap also is rigidly rationed . . . which brings to mind the magnificent job the soap makers of America have been doing in supplying civilian needs while aiding so mightily in the war effort, including the all-important production of glycerine for explosives.

THE DEVELOPMENT LABORATORY has a dual responsibility in Columbia's organization—(1) to devise, for the benefit of customers, new and better methods for using and handling Columbia products and (2) to improve products and production methods in Columbia plants. Among the many achievements in the first category was the original development of special equipment and procedures for handling 73% Liquid Caustic Soda in customers' plants. These installations have enabled numerous customers to effect substantial savings in their operations.

BREAD MADE WITH SEA WATER is a recent development of the Army Quartermaster Corps Subsistance Research Laboratory. Sea water was strained to remove suspended matter such as algae, seaweed and sand . . . and then treated with Calcium Hypochlorite for purification. Using 62 parts of the sea water—instead of 60 parts fresh water and two of salt—with the usual ingredients, the finished product showed only a slight variation from bread made according to standard recipes.

COLUMBIA CHEMICALS include Soda Ash, Caustic Soda, Sodium Bicarbonate, Liquid Chlorine, Silene EF (Hydrated Calcium Silicate), Calcium Chloride, Soda Briquettes, Modified Sodas, Caustic Ash, Phosflake, Calcene T (Precipitated Calcium Carbonate), and Calcium Hypochlorite.

WHEN YOU CHECK UP ON YOUR PLANT'S PAY-ROLL SAVINGS PLAN FIGURES!

These days, things change with astonishing speed. The Pay-Roll Savings Plan set-up that appeared to be an outstanding job a short time ago, may be less than satisfactory today.

How about checking up on the situation in *your* plant? Checking up to see if everybody is playing his, or her, part to the full measure of his, or her, ability. Checking up to see if 'multiple-salary-families' are setting correspondingly multiple-savings records.

A number of other groups may need attention. For example, workers who have come in since your plant's last concerted bond effort. Or, those who have been advanced in position and pay, but who may not have advanced their bond buying accordingly. Or even those few who have never taken part in the plan at all. A little planned selling may step contributions up materially.

But your job isn't finished, even when you've jacked participation in your Pay-Roll Savings Plan up to the very top. You've still got a job before you—and a big one! It's the task of educating your workers to the necessity of not only buying bonds, but of *holding* them. Of teaching your people that a bond sold before full maturity is a bond robbed of its chance to return its full value to its owner—or to his country!

So won't you start *checking* . . . and *teaching* . . . today?

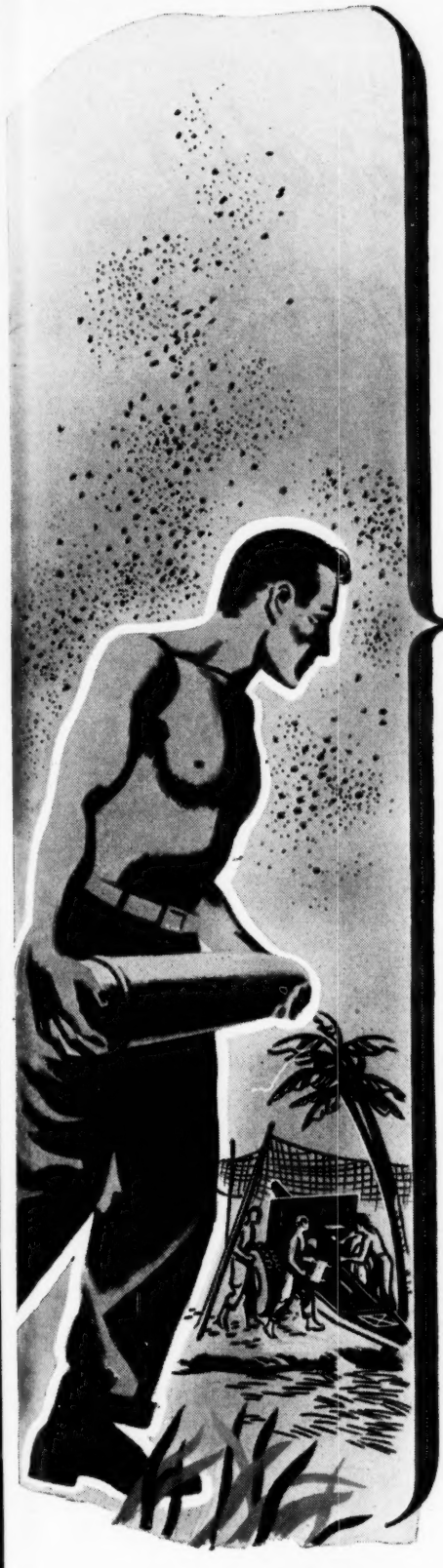
War Bonds To Have And To Hold!

LET'S ALL BACK THE ATTACK WITH WAR BONDS!

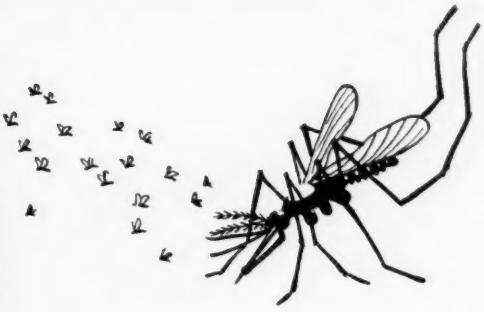
The Treasury Department acknowledges with appreciation the publication of this message by

CHEMICAL INDUSTRIES

This is an official U. S. Treasury advertisement—prepared under auspices of Treasury Department and War Advertising Council



RCI
WORLD-WIDE DISTRIBUTION



produces a new invisible armor against malarial mosquitoes

Topography may change from mountains to plains . . . temperatures from tropic heat to arctic cold . . . the color and allure of local belles may vary as day and night, but one factor never changes—*wherever our fighting men go they find mosquitoes,* always bloodthirsty and usually virulent with disease. In fact, in certain battle areas, more troops have been laid low by mosquito-borne malaria than by the enemy.

The omnipresence and dangerousness of these dreadful pests underscore the significance of a new RCI war contribution—the opening of a new plant devoted solely to the production of a new and astonishingly effective mosquito repellant—*Dimethyl Phthalate.*

There is still some question about how it works but there is *no* question of its effectiveness. Mosquitoes shun it like a cat shuns water. Rubbed on the skin, it is as effective against their attacks as armor plate—yet is odorless and causes no inconvenience to the wearer.

Naturally, the whole supply is now utilized to protect the health and comfort of our troops. But some day—well, imagine a nation fishing, hunting and picnicking without a single sting—or vast malarial and yellow fever districts converted to healthful country. These are the prospects opening up simultaneously with the opening of the new RCI Dimethyl Phthalate Plant.

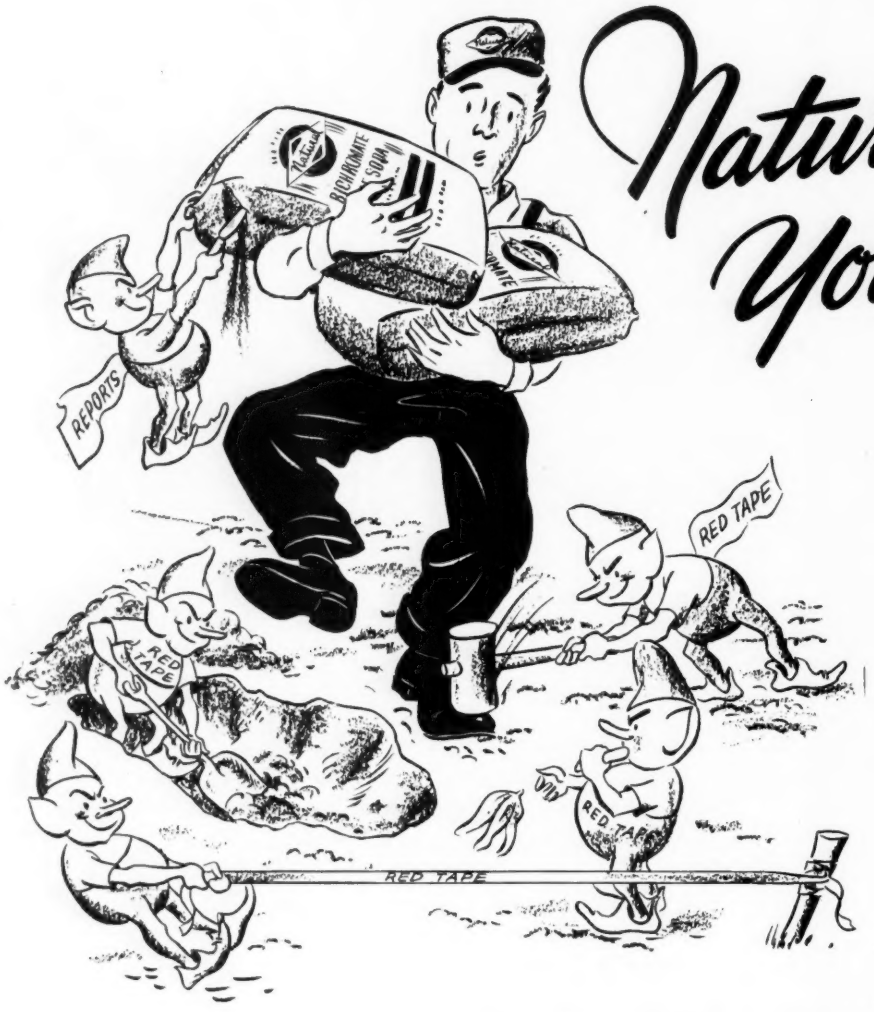
REICHHOLD CHEMICALS, INC.

General Offices and Main Plant, Detroit 20, Michigan

Other Plants: Brooklyn, New York • Elizabeth, New Jersey • South San Francisco, California • Tuscaloosa, Alabama • Liverpool, England • Sydney, Australia

INDUSTRIAL CHEMICALS • SYNTHETIC RESINS • CHEMICAL COLORS • INDUSTRIAL PLASTICS

"Naturally" Yours



BICHROMATE Natural OF SODA

SILLY SYMPATHY SERIES

No. 3. *Obstacle Race Winners*

The Army has no corner on obstacle races. Every day we are winning a tough one right in our own plant. Green and insufficient hands stagger under burdens of red tape, narrowly escape pitfalls in the shape of out-of-repair equipment; bump their toes on tons of forms, declarations, reports. All under a constant barrage from the expediters to speed up production.

Tough going, yes, but we carry on cheerfully doing our bit to help bring Victory nearer. We are heartened by the knowledge that our customers are standing back of us and that Natural Bichromates will continue to be "tops" in quality.

BICHROMATE OF SODA
Crystals - Granular
•
BICHROMATE OF POTASH
Crystals - Granular
Precipitated

Natural
PRODUCTS REFINING CO.
904 GARFIELD AVENUE, JERSEY CITY, N. J.

worth the **RISK?**

by ROBERT L. TAYLOR, editor

APPARENTLY THE PLAN is to recall some young technical men from the armed forces in the event of any crises that may arise in war production as a result of loss of such men to the draft. At least the National Roster of Scientific and Specialized Personnel is making provisions for this possibility.

The Roster this month requested all professionally and scientifically qualified young men about to enter the armed forces to notify it immediately as to the branch of the service they are entering, the date and place of their induction, and their serial numbers after induction. According to the Roster, "It is conceivable that it may become imperative in the future—near or distant—to withdraw a number of professionally and scientifically qualified men from the armed forces in order to assign them to important research or production work in civilian war industry."

THIS CRUMB OF PROVISION against a possible critical technical personnel shortage is of course better than none at all. But it is no insurance. It is no answer to the threat of technological *de*scendency at a time when, if ever, our science and technology must keep on the *as*cendency.

There are clear reasons why provision for recall of essential technical men in case of need is not adequate protection against serious interference with war production—especially if invasion demands for new or more weapons should suddenly multiply sharply.

In the first place, it would mean loss of valuable time in getting these men back where they could do some good. After getting back, it would take some more time for them to get the facts and data on which to work. Conceivably the war could be lengthened months by such a delay of only a few days or weeks. Meeting emergencies as they arise may be good policy in some things, but it isn't enough in the fast-moving business of war.

There is also the consideration that these men will have been "out of practice" for some time. If chemical plants become rusty and outmoded by inactivity, so do chemical brains. Keeping ahead of the enemy in the fields of science and technology is no part time job. We are underestimating the task if we believe that it requires anything less than the full resources of all of the technical brainpower at our command.

And finally, who is to know what new scientific developments may be lost to the world because some young research man was drafted into the armed services, whether he is recalled or not? How many more years would the world have had to wait for synthetic quinine if the young Drs. Woodward and Doering had been in the army or navy instead of a chemical laboratory these past 24 months? You don't just call a man back from the army and ask him to make quinine out of coal—and expect to get your quinine.

THIS POWERFUL NATION CANNOT AFFORD to be lulled into a sense of false security by its spectacular technical developments and production accomplishments to date. And it is no protection to know that we can call back our technical experts—the men who are our real security—if and when we need them. There is danger that we may find we no longer have experts.

It is hard to believe that the adding of a few thousand to our infantry forces is worth the risk.

Power Alcohol in Canada

IT IS A FOREGONE CONCLUSION that there will be tremendous pressure on Congress to legislate power alcohol into our national economy after the war, regardless of the state of our petroleum reserves. If farmers, under the handicap of present manpower shortages, can produce enough wheat to feed this nation, part of Europe, and still have enough left over to produce some 300,000,000 gallons of alcohol, we can be certain of a postwar wheat surplus problem of sizable proportions. And as pointed out by P. A. Singleton in his article on page 676 of this issue, it is this problem and what to do about it that will decide the power alcohol question, rather than any consideration of economics, technology or petroleum reserves.

In this respect a report this month from our Canadian correspondent (page 721) is of special interest. Farm subsidies for wheat surpluses have been costing the Canadian government some $100,000,000 a year in "normal" times. Efforts are already being made at Ottawa to arouse enthusiasm for power alcohol legislation on the ground that it would eliminate the $100,000,000 wheat bill and in addition provide alcohol and a million tons of high protein stock feed. It is reported that a receptive hearing for the proposal seems assured.

Although wheat is not of the same relative magnitude in the United States economy as it is in Canada, the political strength of farm interests here is well known, and if power alcohol legislation is passed in Canada the action may well provide the final push required for similar measures in this country.

Progress of the Canadian developments will be worth watching.

Women Leaving War Jobs

ONE IMPORTANT CONSIDERATION in the continuing manpower problem is the fact that many women are leaving their jobs in factories and plants all over the country. In some critical labor areas this trend has given management considerable cause for worry.

War Manpower Commission officials attribute the exodus of the women to many reasons. The needs of the home and family have exercised a strong pull. Some women have been working in industry for two or three years now, are beginning to get tired and can't take it any more. Some took jobs as a lark or an attribute to glamour but soon found out that work means work. Others took jobs just to make a couple of hundred dollars to clear a debt or to satisfy some personal need. Many feel that they have now done their part, that the war of production is just about over, and that they are no longer needed.

Last but not least, management, in many instances, has not given full attention to the special problems of women workers. Many factors, such as proper recreation and rest room facilities, consideration of shopping and family demands in planning shifts, changes in job methods to better suit the physical abilities of women, relieving monotony as much as possible, and selling the idea that each small task adds up to an important war contribution, have not been fully exploited.

If industry and the various government agencies still want women on the job much can be done to hold and attract them by considering their many special problems, by lifting their morale, and by selling the idea that their efforts are still needed to win the war.

Downward Price Trend

THE PAST FEW MONTHS HAVE WITNESSED a number of downward price revisions in the chemical and plastics field which seem to be the start of a trend that will likely carry over and be more pronounced in the postwar period.

Such a trend reflects greatly expanded production in both private and government owned plants. But in addition to this it shows that the benefits of technological improvement and better efficiency are being passed on to the consumer. This is a healthy course which, if followed by industry in general, is likely to help prevent a debacle of the kind that occurred in the transition period after the first World War.

There has been an uneasy feeling in the minds of many people that the present conflict will be followed by a depression of unprecedented proportions. Fortunately much has been done to dissipate this belief in the last year or so and replace it with a feeling of optimism and a determination to achieve a high level of employment and production. The chemical industry, by sharing the benefits of large scale production and improved technology as indicated in the downward trend of prices, will undoubtedly broaden its markets and help to avoid some of the pitfalls that may otherwise lie ahead.

A Contrast in Values

A NOTE ON THE IMPORTANCE placed by the British on scientific and technical personnel in wartime is found in a report of the Institute of Physics (British) dated March 28, 1944. In this report it is stated that "the number taking science courses during the war has been greatly increased."

Mention is also made that during the first five years after the war British industry will need each year 1500 new chemists, 400 new physicists, and 250 new scientists in other fields. It is emphasized that these scientists are regarded as important entirely out of proportion to their number. They are "in a key position, since by their discoveries they might create employment for many and perhaps even found new industries."

Quite a contrast with our own official attitude, to say the least.

Transmuted Wood

THE STURDY SAWED TIMBERS of the forest are one of the last products of nature to hold their own in the building materials race without the assistance of chemistry. Most of the pure metals long ago gave way to alloys that have greater strength, durability and other advantages. Much more rock today is used in the form of concrete than as natural building stone. Bricks, glass and tile have replaced natural clay. Wood is the only material of construction that is still used in the form that nature made it.

But now even wood, a favorite material of craftsmen through the ages, appears about to undergo some man-made changes. What amounts to virtually a transmutation of wood has recently been announced by the Du Pont Company. This "transmuted wood," described on page 680, resulted from work begun in the Forest Products Laboratory of the Department of Agriculture and then carried on by Du Pont. An organic compound, methylolurea, is combined with the wood to form a material superior to wood in many respects but also retaining the appearance, feel, and other desirable characteristics of the natural product.

If the economics of the process permit the material to exploit the full potential of its unusual properties, it may become necessary for grandson to go out and chop down a tree to see what plain old fashioned wood is like.

Safety and health protection are only part of good working conditions. Equally important are such intangibles as how workmen "get on" with foremen, whether workman feels he "belongs." Chemical industry score is good.

Survey of Working Conditions in the CHEMICAL INDUSTRY

by PAUL W. HARDY, Chief, Field Staff, Management Division, Labor Relations Institute

HERE IS A REPRESENTATIVE PICTURE of personnel facilities and policies in the chemical industry, as shown by a survey conducted jointly last month by the Labor Relations Institute and Chemical Industries. Generally speaking, it reflects acceptance of good labor relations techniques.

WAR and the manpower situation have combined to place new emphasis on an old problem in industry—that of suitable working conditions. Like most other manufacturers today, employers in the chemical industries are paying increased attention to the tangibles and intangibles which add up to make a wholesome working environment. Some of these factors are physical, and deal with such things as safety equipment, locker and restroom facilities, showers for employees, and proper cleanliness and light in the shop. Others involve safety programs, medical attendance, physical examinations, antiseptic foot baths, etc.

What industry in general has not realized, however, is the paramount need for better employee relations, which actually constitute the third leg on the working conditions stool. How a worker "gets on" with his foreman; whether or not he feels he "belongs"; his ability to state a grievance without being considered a complainer or an upstart; the provisions, or lack of them, for in-plant training, upgrading and promotion—these are basic fundamentals of good labor relations.

There is a tendency on the part of small business to say, "These things are all right for big corporations. We are too small. We don't need them. Any employee with a grievance can walk right into the boss's office and have his say. We find it better to be *informal* about such things. After all, we're just one happy family."

Such an attitude is the enemy of good working conditions. A formalized, impersonal grievance procedure, for instance, is a "must" in up-to-date labor relations—and so is an equally formalized system of appeals from the foreman's decision. A definite training program and an established system for upgrading and promotion belong in the same category. Without them, the worker is too often dependent upon whim or favoritism for promotion. Foremen meetings and foreman training programs are closely related, because enlightened foremanship is another cardinal factor in improving employee relations.

In the joint survey of working conditions conducted in April by CHEMICAL INDUS-

PERSONNEL POLICIES AND WORKING

NOTE: All figures are percentages.

Example: Of plants making principally heavy inorganic chemicals and employing under 100 persons, 38% answered "yes" to Question No. 1; 21% answered "no"; and 45% answered "informal." Some who answered "no" also answered informal." Therefore total is greater than 100.

		Plants in which mfr. of Heavy Inorganic Chemicals predominates			Plants in which mfr. of Heavy Organic Chemicals predominates			Plants in which mfr. of Fine Chemicals predominates			Plants in which mfr. of Chemical Specialties predominates			All Chemicals		
		No. Employees			No. Employees			No. Employees			No. Employees			No. Employees		
		Under 100	100 to 500	Over 500	Under 100	100 to 500	Over 500	Under 100	100 to 500	Over 500	Under 100	100 to 500	Over 500	Under 100	100 to 500	Over 500
I. EMPLOYEE RELATIONS																
1. Do you have a formalized grievance procedure?	Yes	38	72	90	50	75	84	19	48	75	16	46	64	**21**	**58**	**81**
	No	21	13	5	19	8	8	14	10	8	33	23	0	**26**	**15**	**6**
	Informal	45	13	0	19	33	8	48	33	8	49	9	27	**28**	**18**	**7**
2. Does the worker with a grievance present it first to:	Foreman	72	84	65	50	75	92	62	66	75	57	69	64	**60**	**74**	**64**
	Shop Steward	10	6	40	31	25	23	10	19	33	9	23	46	**12**	**17**	**33**
	Other	14	6	0	6	8	8	5	14	0	13	9	9	**11**	**9**	**3**
3. Is there a system of appeals from the foreman's decision?	Yes	83	87	85	75	100	96	62	90	92	67	80	91	**71**	**87**	**91**
	No	17	13	0	0	0	4	5	5	0	15	11	0	**12**	**9**	**1**
4. Is a written report made out on every grievance?	Yes	14	41	60	13	50	50	5	14	50	6	29	36	**8**	**32**	**51**
	No	86	59	30	75	58	50	71	81	50	85	69	55	**83**	**68**	**45**
5. Do you have an incentive system?	Yes	31	25	20	31	33	50	14	33	17	15	26	36	**14**	**16**	**31**
	No	45	41	55	19	50	23	24	33	42	28	43	46	**40**	**41**	**39**
	Not feasible	31	37	10	31	33	15	19	28	25	49	23	9	**38**	**30**	**15**
	For certain groups	14	19	15	6	0	15	10	5	8	5	16	18	**8**	**13**	**15**
6. Do you have a Labor-Management Committee?	Yes	14	28	25	25	33	54	19	48	42	18	23	55	**17**	**31**	**44**
	No	86	72	75	62	67	42	62	48	50	79	40	36	**77**	**59**	**52**
7. If yes, does it contribute to better production and morale?	Yes	75	89	80	75	75	71	75	60	60	92	75	67	**87**	**77**	**73**
	No	0	11	20	25	25	14	25	10	40	0	0	0	**9**	**13**	**17**
8. Do you expect to continue the Committee after the war?	Yes	75	89	100	75	75	57	75	50	60	83	50	67	**83**	**65**	**67**
	No	0	11	0	25	25	14	25	20	40	0	0	0	**9**	**13**	**13**
9. Do you have a suggestion system?	Yes	48	66	75	44	92	58	48	48	75	52	49	36	**50**	**60**	**62**
	No	52	28	25	44	8	38	33	24	17	30	54	55	**38**	**34**	**33**
10. Is your suggestion system a success?	Yes	64	62	73	44	64	93	30	90	89	60	29	50	**67**	**58**	**88**
	No	36	33	7	6	27	7	50	0	11	40	71	50	**33**	**38**	**12**
11. Do you have an employee retirement plan?	Yes	21	50	50	13	25	54	33	33	67	24	26	18	**23**	**36**	**49**
	No	79	47	45	75	75	42	52	62	25	75	63	55	**72**	**60**	**42**
12. Do you have a profit-sharing plan for your employees?	Yes	31	6	15	0	16	4	14	10	8	9	11	9	**14**	**12**	**9**
	No	69	84	85	88	84	96	62	86	83	83	89	91	**77**	**88**	**90**
13. Do your production workers receive paid vacations?	Yes	96	88	90	81	100	92	81	95	91	94	94	100	**94**	**96**	**93**
	No	4	3	0	6	0	4	0	0	0	3	3	0	**3**	**1**	**1**
14. If yes, how long are the vacations?	1 wk.	82	57	56	69	58	21	59	35	36	62	49	64	**61**	**46**	**41**
	2 wks.	79	64	67	54	75	75	59	75	45	41	91	36	**49**	**72**	**58**
15. Do you have an employee handbook?	Yes	14	31	50	6	29	58	14	33	59	6	29	36	**8**	**31**	**52**
	No	86	53	50	81	71	38	66	52	25	87	71	55	**83**	**64**	**42**

TRIES and the Labor Relations Institute, these factors have been given equal weight with physical working conditions. The timeliness of the survey and the interest which employers in the chemical industry have in the subject is evidenced by the fact that 30 per cent of the questionnaires were filled in and returned. Generally speaking, they reflect acceptance of good labor relations techniques.

Paid Vacations Widespread

The provision of paid vacations for production workers, for instance, is a hallmark of progressive managements—and 94 per cent of the 302 responses stated that such vacations are given. Of these, 53 per cent give their employees one week off; 63 per cent cited paid vacations of two weeks. (The two figures exceed 100 when added because some plants checked both questions, evidently because they give from one to two weeks depending on length of service.) Unlike most of the questions asked, size of plant did not have much bearing on the answers in this particular case. Ninety-four per cent of the plants with less than 100 employees said that they give paid vacations; 96 per cent of those with 100 to 500, and 93 per cent of those whose workers exceed 1,000.

In most cases, however, the higher scores go to the plants with the largest number of employees. In the matter of grievance procedures, for instance, 81 per cent of the plants in the "over 1,000" group stated that they have a formalized method of handling grievances, as against 58 per cent in the 100 to 500 bracket, and only 21 per cent of those with less than 100 workers. These figures compare

CONDITIONS IN THE CHEMICAL INDUSTRY

NOTE: All figures are percentages.

Example: Of plants making principally heavy inorganic chemicals and employing under 100 persons, 8% answered "yes" to Question No. 1; 21% answered "no"; and 45% answered "informal." Some who answered "no" also answered informal." Therefore total is greater than 100.

		Plants in which mfr. of Heavy Inorganic Chemicals predominates			Plants in which mfr. of Heavy Organic Chemicals predominates			Plants in which mfr. of Fine Chemicals predominates			Plants in which mfr. of Chemical Specialties predominates			All Chemicals		
		No. Employees			No. Employees			No. Employees			No. Employees			No. Employees		
		Under 100	100 to 500	Over 500	Under 100	100 to 500	Over 500	Under 100	100 to 500	Over 500	Under 100	100 to 500	Over 500	Under 100	100 to 500	Over 500
16. Do you have an employee publication?	Yes	10	44	65	19	36	77	10	43	50	6	34	73	**9**	**40**	**63**
	No	90	53	35	69	64	23	72	43	42	88	66	27	**86**	**58**	**31**
17. How would you rate your employees' morale?	Good	48	63	35	50	57	65	48	52	67	66	51	73	**56**	**56**	**58**
	Fair	45	37	60	38	36	31	38	38	25	30	54	9	**36**	**42**	**35**
	Poor	7	0	0	0	7	0	0	0	0	4	3	18	**4**	**2**	**3**
II. TRAINING AND PROMOTION																
18. Do you have an in-plant training program?	Yes	28	34	40	13	55	54	14	57	50	15	21	55	**19**	**33**	**49**
	No	65	41	20	62	30	12	29	33	0	75	71	18	**64**	**52**	**13**
	Certain groups	7	13	40	13	15	35	5	10	42	6	11	27	**7**	**11**	**36**
19. Do you give pre-employment training to new workers?	Yes	20	3	10	6	15	19	5	19	25	7	3	9	**10**	**8**	**16**
	No	80	94	85	81	85	81	71	76	58	88	97	91	**84**	**91**	**80**
20. Do you have an apprentice system?	Yes	24	41	70	13	50	58	21	14	33	12	27	36	**16**	**31**	**54**
	No	76	53	30	75	50	35	57	76	58	84	71	64	**77**	**64**	**44**
21. Who trains employees in your plant?	Foremen	93	91	95	81	93	88	62	86	67	81	91	64	**80**	**79**	**83**
	Special trainers	17	22	15	0	7	62	14	14	25	4	17	46	**8**	**17**	**39**
	Gov't instructors	0	6	10	0	0	8	0	5	8	0	3	0	**0**	**4**	**7**
22. Do you have an established system for upgrading and promotion?	Yes	48	69	90	56	64	81	38	76	75	40	49	55	**44**	**66**	**78**
	No	52	31	10	31	36	15	43	24	8	52	51	45	**50**	**38**	**17**
23. Do you have a foreman training program?	Yes	24	50	60	0	50	69	10	38	50	12	40	73	**13**	**45**	**65**
	No	76	44	35	88	50	31	62	52	42	84	60	27	**80**	**54**	**33**
24. Do you hold foreman meetings or conferences?	Yes	55	84	95	50	71	92	33	67	75	33	83	91	**40**	**79**	**90**
	No	31	16	5	38	29	8	48	29	8	60	17	11	**49**	**21**	**6**
25. If yes, how frequently?	Weekly	25	11	16	13	30	42	14	21	11	32	38	30	**25**	**21**	**27**
	Semi-monthly	13	4	16	0	0	8	29	29	11	0	24	20	**8**	**12**	**13**
	Monthly	6	33	21	25	30	17	0	21	44	14	14	20	**11**	**19**	**23**
	Occasionally	43	59	42	38	40	29	42	29	56	50	31	30	**45**	**33**	**37**
III. ABSENTEEISM AND TURNOVER																
26. Do you keep absenteeism records?	Yes	59	90	80	50	64	96	38	90	83	43	80	82	**47**	**86**	**87**
	No	41	10	5	38	0	0	29	10	0	49	20	18	**43**	**12**	**4**
27. Do you conduct post-absence interviews?	Yes	55	69	60	31	57	69	33	81	50	40	51	82	**41**	**65**	**65**
	No	34	31	25	63	14	27	33	19	25	49	31	18	**45**	**27**	**25**
28. Do you keep records of turnover and reasons for leaving?	Yes	69	90	95	75	100	88	43	86	83	55	83	91	**59**	**87**	**90**
	No	24	10	5	19	0	4	33	19	0	37	17	9	**32**	**13**	**3**
Number of Responses		29	32	20	16	12	26	21	21	12	67	35	11	133	100	69

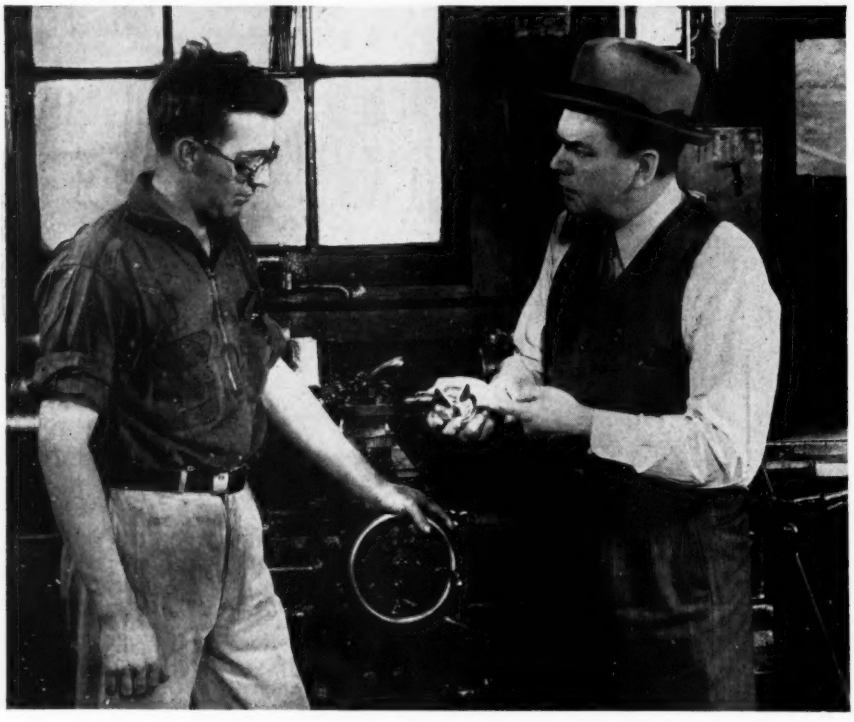
with a 49 per cent response on an industry-wide basis.

Looking at it another way, the size of the plant evidently has more influence on its labor relations course than the particular branch of the industry to which it belongs. The industry-wide response to the question, "Do you have an established system for upgrading and promotion?" was 58 per cent affirmative. Broken down by size of plant, the "above 1,000" score was 78 per cent; the 100-500 was 66 per cent and the "under 100" was 44 per cent. Responses from the heavy organic field, half of which came from large plants, were 74 per cent affirmative. From the heavy inorganic branch, with 25 per cent of the check-sheets coming from plants with over 500 employees the figure was 67 per cent. From the fine chemicals group, 78 per cent in the "under 500" bracket, the answer was only 61 per cent in the affirmative. On the other hand, the chemical specialty group, with 90 per cent of its responses from plants with less than 500 employees, scored a 45 per cent "yes" on this question.

Size of plant would clearly be the deciding factor in such questions as "Do you have a Labor-Management Committee?" Only 17 per cent of the plants with under 100 employees answered yes to this question. Operations with 100 to 500 workers scored 31 per cent, while those with more than 1,000 checked off 44 per cent. Yet only 28 per cent of the industry as a whole, as reflected in the survey, has such committees. The affirmative answers from the four product divisions

were as follows: heavy inorganic, 22 per cent; heavy organic, 37 per cent; fine chemical, 33 per cent, and specialty, 23 per cent.

It is interesting to note that 82 per cent of all chemical plants now possessing Labor-Management Committees report that they contribute to better production and morale, and that 67 per cent of these expect to continue the device after the war. Similarly, 61 per cent of the plants with suggestion systems advise that they consider them a success.



Employee-foreman co-operation and understanding are essential for good labor relations.

Although employee handbooks are becoming recognized more and more as essential labor-relations equipment, even in small plants, the responses to the survey show that relatively few chemical companies have adopted them. Only 87 of the total 302, or 28 per cent, answered yes to this question. Here again, size evidently was the deciding factor, since only 8 per cent of the plants with fewer than 100 employees use handbooks, as compared with 31 per cent in the 100-500 bracket and 52 per cent in those with more than 1,000. The highest branch score was 37 per cent in the heavy organic industry—the lowest, 16 per cent in the specialty field.

But the relative absence of employee handbooks in the under-100 and 100-500 groups apparently has not affected the workers' morale, for the first classification scored 56 per cent in rating its employee morale as good, as did the 100-500 group. In the over-1000 bracket, the figure was 53 per cent. Thirty-six per cent of the small employers admitted that morale was only fair; 42 per cent of the 100-500 said the same thing, and 35 per cent of the responses from the over-1,000 field checked "fair" instead of "good." Industrywide figures on the same point were: good, 54 per cent; fair, 38 per cent; poor, 3 per cent. Identical scores were registered by the heavy inorganic and specialty fields—61 per cent "good." The heavy organic industry responses to "good" were 54 per cent; those from the fine chemical field were 53 per cent.

Foreman Training

As might have been anticipated, the greatest interest in foreman training was evidenced by the larger companies—65 per cent in the top group, 45 per cent in the median, and only 13 per cent in the "under 100" classification. The greatest use of foremen meetings was shown to be in the heavy organic and heavy inorganic divisions of the industry—54 per cent in the former and 76 per cent in the latter.

There is a diversity in practice in regard to the frequency of foreman meetings. Twenty-five per cent of the reporting plants hold weekly sessions; 24 per cent hold them twice each month; 12 per cent have foremen meetings monthly, while the largest group—79 plants, or 40 per cent of those which hold meetings of this type, report that they convene occasionally. The weekly practice is most general in the heavy organic chemical field, 15 plants so reporting out of 42 that hold foreman conferences. The second contender in this phase is the specialty branch, 21 of the 62 plants which hold meetings—or 18 per cent—doing so every week.

"Who trains employees?" is always a significant question, and the survey shows that foremen bear the brunt of this work in the chemical industry, 91 per cent of the responding plants following this practice. All of the firms reporting from the specialty field delegate this work to the foremen; 93 per cent of those in the heavy organic industry; 90 per cent in the heavy inorganic, and 72 per cent in the fine chemical. Relatively little use is made of special trainers—14 per cent, industry wide—and practicallly none of government instructors.

The chemical industry, like most others, has learned the value of absenteeism records. Sixty-eight per cent of the total of 302 reporting plants—208 in number—answered yes to the question, "Do you keep absenteeism records?" To the question, "Do you conduct post-absence interviews?" 165, or 54 per cent, answered that they did. Records of turnover and reasons for leaving were reported to be kept by 229 plants, or three-fourths of those responding. Of these, 94 require the severing employee to report to the personnel department for an interview. In 28 firms, the president handles such interviews—15 of them in the specialty group and 11 in the heavy organic, as compared with 1 each in the heavy inorganic and fine chemical fields. In all such cases, the firms reporting have less than 500 employees, and the majority of them have less than 100. Other executives mentioned as performing this duty include superintendents—49 in number (the second largest numerical group, and largely confined to the companies with less than 500 workers)—supervisors, production managers, general managers and plant engineers. Less than a handful of companies delegate this responsibility to the foremen.

The countrywide nature of the survey is indicated by the following returns by states: Alabama, 1; California, 25; Connecticut, 3; Delaware, 1; Florida, 5; Georgia, 1; Illinois, 19; Indiana, 3; Iowa, 2; Kansas, 4; Kentucky, 3; Louisiana, 3; Maine, 1; Maryland, 7; Massachusetts, 8; Michigan, 27; Minnesota, 2; Missouri 8; New Hampshire, 2; New Jersey, 44; New York, 39; North Carolina, 1; Ohio, 20; Oklahoma, 3; Oregon, 1; Pennsylvania, 29; Rhode Island, 3; Tennessee, 6; Texas, 7; Virginia, 5; Washington, 5; West Virginia, 4, and Wisconsin, 4.

The check-sheets employed in the survey also included 35 questions regarding safety and health provisions, wash-up equipment and practices, in-plant eating facilities, rest periods, plant housekeeping, etc. The data supplied on these points is being collated and analyzed, and will provide the basis for a second article to be published next month.

How 28 Major CHEMICAL COMPANIES Fared in 1943

by MICHAEL PESCATELLO
Carnegie Corporation

HIGHER OPERATING COSTS AND TAXES again made deep impressions in the 1943 fiscal records of leading chemical companies. But volume and rate of output were the highest on record, and value of assets showed a marked increase over 1939. Near term pessimism is reflected in declined market value equity.

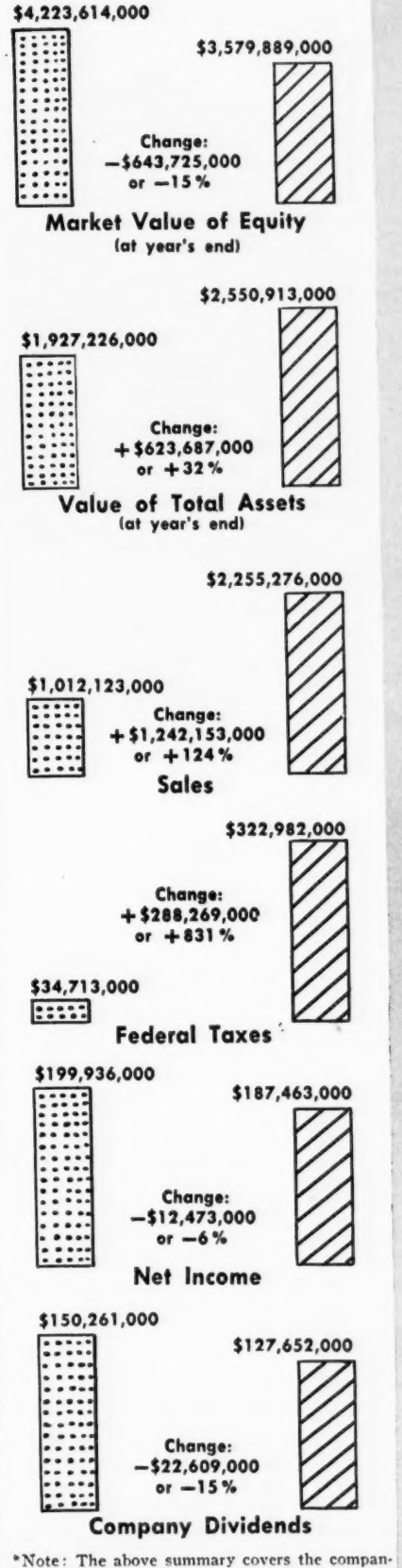
IN 1943 the country's principal chemical companies made and sold more goods, had more assets, and paid substantially more taxes than in any previous period in the industry's experience. Against this outstanding record of achievement there is considerable significance in the fact that relative to work done and assets employed, net income was at an all time low. Judged by anything but war standards this performance would necessarily have constituted a serious indictment of managerial ability. In war, however, the emphasis is on the volume and rate of output rather than on financial results. And in meeting the demands placed upon it the industry's 1943 record speaks for itself.

An analysis of chemical companies' operations in 1943 would, under ordinary circumstances, be concerned with comparisons with the results of the previous year. This would show the degree of progress made in two full years of production directed to war requirements. The results, though interesting in themselves, would reflect the accelerated pace that has been induced by war. Since the year 1943 may conceivably have been the period of peak output, it would appear to be of more significance to contrast the record of that year with 1939. During the latter period the economy had not yet been influenced to any material extent either by war preparations or national defense requirements. Thus a contrast between the last pre-war year of good business and the possibly peak year of war offers an interesting comparison between two periods of time when the chemical industry was called upon to utilize its resources and ingenuity far beyond anything conceivable in 1939.

The charts on this page summarize certain pertinent data of twenty-seven chemical companies which represent a comprehensive cross-section of the industry. The outstanding single item showing what has been achieved in five years is the sales figure. Between 1939 and 1943 these twenty-seven companies more than doubled their output from a level of approximately $1 billion to $2.2 billion. The increase was 124 per cent during the period. Since these are dollar figures, some question naturally arises with respect to physical volume. Prices for chemical products, however, have risen very moderately since 1939, so that there is very little distortion in this comparison. Indeed, if the Bureau of Labor Statistics index of wholesale prices for chemical products (1926=100) can be taken as a criterion, it may be noted that in 1939 they *averaged* 84.7. That index reached a *peak* of 96.9 in 1943. The increase is approximately 14 per cent. It is therefore probably safe to say that the physical volume of output of these twenty-seven chemical companies in 1943 was easily more than double the volume in 1939. This presumption appears to be amply substantiated by the Federal Reserve Bank's index of industrial production of chemicals. Using the base 1935-1939=100, the index averaged 112 in 1939 and reached a peak of 401 last year. Such a record may not be representative with respect to the twenty-seven companies analyzed in the summary, but it is indicative of the performance achieved.

These same companies increased their total assets during the period by $623 million or 32 per cent. In 1939 every dollar of assets produced 52 cents in sales, while in 1943 the figure rose to 88

COMPARATIVE FINANCIAL SUMMARY OF 27 CHEMICAL COMPANIES for the years 1939 and 1943



*Note: The above summary covers the companies listed on the following page, with the exception of American Cyanamid Co. for which sales data is not available.

TWENTY-EIGHT CHEMICAL COMPANIES---COMPARISON 1943-1939

		Millions of Dollars			Thousands of Dollars		
		Market Value of Equity (Year End)	Total Assets (Year End)	Sales and/or Oper. Rev.	Federal Taxes	Net Income	Common Dividends
Air Reduction	1939	$146.1	$44.2	$27.6	$1,019	$5,077	$3,846
	1943	**108.5**	**69.6**	**94.1**	**12,647**	**6.545**	**5,427**
Allied Chemical and Dye	1939	391.8	236.6	167.9	4,513	21,042	19,927
	1943	**327.6**	**288.6**	**285.3**	**20,434**	**19,024**	**13,284**
American Agricultural Chemical (1)	1939	12.5	21.5	17.5	65	765	869
	1943	**18.8**	**27.1**	**30.0**	**1,700**	**2,025**	**1,067**
American Cyanamid	1939	89.0	77.3	....	1,111	5,525	4,189
	1943	**106.6**	**152.2**	....	**20,000**	**6,784**	**3,563**
Atlas Powder	1939	16.0	22.4	16.5	284	1,299	747
	1943	**14.3**	**38.8**	**39.9**	**4,075**	**1,743**	**834**
Columbian Carbon	1939	49.9	30.6	15.1	506	2,857	2,418
	1943	**47.2**	**35.2**	**21.1**	**1,350**	**3,106**	**2,150**
Commercial Solvents	1939	36.9	20.0	14.4	250	1,600	....
	1943	**39.5**	**29.9**	**47.2**	**6,888**	**2,899**	**1,582**
Davison Chemical (1)	1939	3.5	11.7	9.4	10	—278	....
	1943	**7.1**	**15.2**	**21.6**	**917**	**1,293**	**514**
Dow Chemical (2)	1939	148.6	41.8	26.7	678	4,178	2,965
	1943	**162.3**	**119.0**	**105.4**	**18,248**	**8,225**	**3,746**
Du Pont (3)	1939	2,013.9	735.8	298.8	14,050	93,219	77,359
	1943	**1,555.4**	**903.5**	**585.4**	**118,307**	**69,707**	**47,225**
Freeport Sulphur	1939	26.2	23.2	9.0	169	2,201	1,195
	1943	**24.8**	**28.0**	**17.2**	**885**	**2,483**	**1,600**
General Aniline and Film (4)	1939	40.7	61.4	25.8	707	4,482	1,753
	1943	**38.1**	**69.4**	**58.8**	**9,004**	**3,625**	....
Hercules Powder	1939	117.1	49.1	41.0	1,276	5,325	3,753
	1943	**106.6**	**96.5**	**122.5**	**17,724**	**5,704**	**3,292**
Hilton-Davis Chemical (1)	1939	2.3	2.3	2.2	36	170	73
	1943	**2.0**	**4.4**	**6.3**	**297**	**219**	**118**
Int'l Mineral and Chemical (1)	1939	0.8	27.2	11.7	....	126	....
	1943	**7.0**	**33.4**	**22.4**	**1,240**	**2,076**	**467**
Int'l Salt	1939	8.6	13.5	7.0	132	462	420
	1943	**9.6**	**14.1**	**10.1**	**1,638**	**705**	**600**
Mathieson Alkali	1939	24.8	24.8	10.9	215	1,096	1,242
	1943	**17.3**	**27.4**	**18.2**	**1,550**	**1,273**	**828**
Monsanto Chemical	1939	135.3	54.7	42.9	1,508	5,429	3,725
	1943	**99.3**	**72.2**	**81.6**	**10,085**	**5,316**	**2,794**
National Cylinder Gas	1939	12.2	6.9	4.9	210	1,001	470
	1943	**16.0**	**16.7**	**26.6**	**4,673**	**2,146**	**1,065**
Newport Industries	1939	8.0	5.6	4.5	81	409	....
	1943	**11.1**	**6.7**	**9.4**	**1,250**	**674**	**497**
Pennsylvania Salt Mfg. (1)	1939	25.2	16.7	9.5	301	1,294	750
	1943	**23.8**	**24.3**	**26.5**	**2,615**	**1,400**	**1,012**
Texas Gulf Sulphur	1939	126.7	61.9	20.8	1,075	7,847	7,680
	1943	**134.4**	**66.8**	**28.3**	**6,380**	**7,966**	**8,640**
Union Carbide and Carbon (5)	1939	807.1	336.8	170.3	6,658	35,847	18,274
	1943	**742.2**	**459.4**	**495.9**	**74,892**	**32,807**	**27,833**

TWENTY-EIGHT CHEMICAL COMPANIES---COMPARISON 1943-1939

		Millions of Dollars			Thousands of Dollars		
		Market Value of Equity (Year End)	Total Assets (Year End)	Sales and/or Oper. Rev.	Federal Taxes	Net Income	Common Dividends
United Carbon	1939	23.8	16.4	8.5	357	1,518	1,193
	1943	**25.8**	**19.7**	**11.3**	**1,020**	**2,047**	**1,193**
U. S. Industrial Chemicals (6)	1939	8.9	13.8	11.9	....	77	....
	1943	**13.1**	**29.1**	**29.7**	**1,280**	**1,153**	**565**
Victor Chemical Works	1939	20.8	8.7	8.3	247	1,104	974
	1943	**15.7**	**10.3**	**14.5**	**2,025**	**1,148**	**824**
Virginia-Carolina Chemical (1)	1939	1.9	25.5	16.8	78	514	....
	1943	**1.9**	**29.3**	**26.4**	**1,019**	**978**	....
Westvaco Chlorine	1939	12.5	13.1	10.8	288	1,275	628
	1943	**9.1**	**14.9**	**18.1**	**839**	**1,176**	**494**

(1) Year or year ended June 30.
(2) Year or year ended May 31.
(3) The value of Du Pont's investment of 10,000,000 shares of General Motors common stock and the income derived therefrom was as follows:

	Stated Value Dec. 31	Income Received
1939	$197,000,000	$35,000,000
1943	231,500,000	20,000,000

(4) Equity value is represented by the 529,701 and 529,693 "A" stock outstanding in 1943 and 1939 respectively.
(5) 1943 sales are approximate.
(6) 1943 data are for year or year ended March 31 except value of equity.

cents, reflecting a much more intensive use of facilities.

Sales Up—Income Down

From the standpoint of financial results attained, the record is far less favorable than is indicated by the growth in sales and assets. Despite an increase of over $1 billion in sales, net income available to stockholders was *less* in 1943 than in 1939—by 6 per cent. Each dollar of sales produced 20 cents in net income during the latter year, while in 1943 the figure had declined to 8 cents for each dollar of sales.

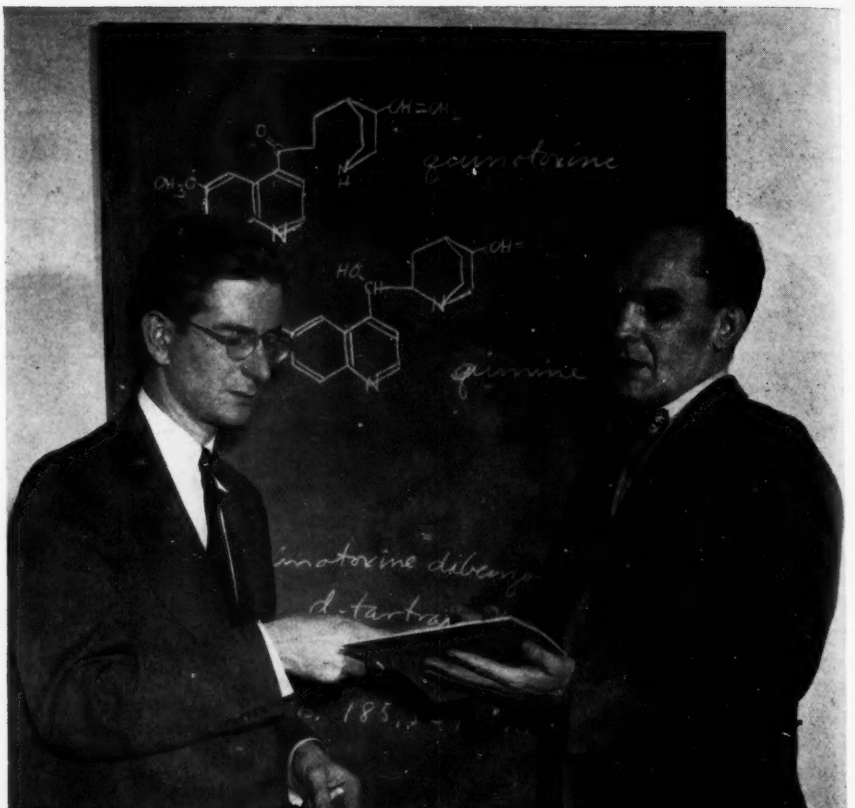
There are two important reasons for this significant change in earning power. One is obvious in the table. Federal taxes paid increased by 831 per cent, that is, from $34 million in 1939 to $322 million in 1943. Such taxes took about 3 cents out of each dollar of sales in 1939 and more than 14 cents last year. The second reason, not evident in the table, is higher labor and raw material costs—a situation common to all industries. These two factors—costs and taxes—have served as effective restraints on earning power. Rising costs have squeezed profit margins. And where these have been offset by considerably larger volumes, a ceiling on net income has been set by federal taxes. This has important implications for the future. Although the tax burden is expected to ease after the war, especially if excess profits taxes are removed, a great and rapid decline in volume of war business may not as easily and quickly be followed by reduction in operating costs.

Dividend disbursements in the years 1939 and 1943 give tangible evidence that the owners of these businesses have not only not profited by greatly increased volume of output, but received less in the 1943 peak year than in 1939. This is so even if the "other income" of Du Pont, representing common dividends from its General Motors investments, is taken into account. The reduced flow of income to stockholders in the face of an expansion of more than a billion dollars in sales and some $623 million in total assets is of real significance. There could be little question in view of these facts as to the profitableness of war so far as one segment of the economy is concerned. Such a trend if continued can have a very serious effect on incentive for enterprise to progress as in the past. As long as war conditions prevail there can be little hope for amelioration in this direction. But should betterment be prolonged or unduly retarded, society can easily be victim of shortsightedness.

The summary charts offer a good example of private enterprise at work. Twenty-seven companies in one of the country's most dynamic industries have more than doubled their output and expanded their resources under the driving force of war. It can hardly be said that the profit motive has spearheaded this drive, for income and dividend-wise the gains have been nil. So long as war conditions prevail, this may be expected to continue. But once these conditions are removed, patriotism must of necessity be again superseded by the hard fact of reasonable profits.

Uncertainties Reflected in Equities

That the war has created doubts and uncertainties is evidenced by the value placed on the equities of the twenty-seven companies. At the year end 1939 the market value of the common stocks of these enterprises was $643 million greater than their value at the end of 1943. This, in spite of the fact that sales were more than a billion dollars greater last year and total resources were larger by an amount of $623 million! These are hard figures of reality that one may well ponder seriously. Here is very tangible evidence of investors' fears regarding the present value of their enterprises. Such an attitude may eventually prove to have been an excess of pessimism. But under present war-time conditions the impact of operating costs and taxes on net income must remain the major influencing factors in evaluating comparatively near term earning power.



Robert Burns Woodward and William von Eggers Doering, the two 27-year-old chemists who worked out the first complete synthesis of quinine.

Synthesis of QUININE Ends 88-Year Search

THE TOTAL SYNTHESIS of quinine by two young American chemists, announced this month by the Polaroid Corporation who sponsored the work, marks the end of 88 years of search by scientists throughout the world for a method of making the cinchona alkaloid from common chemical raw materials.

Robert B. Woodward and William E. Doering described how they solved the classic problem in a communication to the editor of the *Journal of the American Chemical Society*. The plan for synthesizing the complex drug was originated by Dr. Woodward and incorporated as a project in the basic research program of Polaroid Corporation early last year. A Harvard instructor in organic chemistry, Dr. Woodward has been chemical consultant to Polaroid since June 1942. Dr. Doering was engaged by Polaroid to work as collaborator on the project. He has since become an instructor in organic chemistry at Columbia University. Both men are 27 years old.

Woodward and Doering took less than fourteen months to complete their work. Their new synthetic material is a precise duplicate of natural quinine. In this respect it is completely unlike atabrine and plasmochin, which are used as partial substitutes for natural quinine in the treatment of malaria but actually have no chemical resemblance to quinine.

Military interest in the new process relates to its possibiity as a replacement for the vast quinine-bearing cinchona tree plantations in the Jap-held Netherlands East Indies. These plantations were formerly the chief source of quinine supply for the world. It is by no means

MILESTONES IN THE QUEST FOR QUININE

1820 Quinine was isolated for the first time from the other alkaloids of the cinchona bark by two French chemists, Pelletier and Caventou.

1853 Pasteur made quinotoxine from quinine. Although this was achieved by a simple chemical process, it is worthy of note because it was the first time that quinotoxine was ever recorded.

1855 The German chemist, Strecker, established the number of atoms of carbon, hydrogen, nitrogen and oxygen present in the quinine molecule.

1856 In an effort to help combat a malaria epidemic, William Henry Perkin, who later in his life was knighted, made the first recorded effort to synthesize quinine. Perkin hoped to duplicate the quinine molecular structure by combining the requisite number and kind of atoms which he had extracted from common chemicals, principally coal tar derivatives. Although he failed to produce quinine, Perkin synthesized the dye, mauve.

certain, however, that the synthetic drug can be manufactured on a large scale for use during the war.

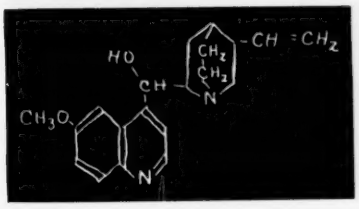
Commenting on the new synthesis, Edwin H. Land, President and Director of Research of Polaroid Corporation, declared, "As yet it has not been determined whether the rather intricate process involved in this synthesis can be made commercially practicable. Polaroid's main interest is in the scientific and military contribution involved in this project." Land added: "We do not expect to manufacture the products involved, but intend to license the process, after consultation with Government authorities, to such organizations as are best fitted to assure the broadest usefulness for the scientific discovery. We intend to utilize any proceeds so far as practicable in furthering similar scientific projects."

In achieving their goal, Woodward and Doering not only duplicated quinine but in addition created an entirely new substance, the optical isomer of quinine. If the isomer is found to have the therapeutic properties of natural and synthetic quinine, the combined anti-malarial substances would be much easier to produce because it would not be necessary to separate the synthetic quinine from the isomer.

The Woodward-Doering work is also significant because it promises to pave the way for other new quinine-like materials that nature has never provided.

According to the Woodward-Doering article in the "Journal of the American Chemical Society," "Quinine preparations have been known and used for centuries in the treatment of malaria. The pure crystalline alkaloid was isolated in 1820, and the extensive degradative researches of the last century culminated in the proposal of the correct structure in 1908, but the complexity of the molecule has placed hitherto insurmountable difficulties in the way of the total synthesis of the drug."

THE WOODWARD-DOERING SYNTHESIS



FOLLOWING IS an outline of the method used by R. B. Woodward and W. E. Doering in their synthesis of quinine, as communicated to the editor of the *Journal of the American Chemical Society*, May, 1944:

7-Hydroxyisoquiniline was converted through its 8-piperidinomethyl derivative into 7-hydroxy-8-methylisoquinoline. Hydrogenation over platinum oxide to 7-hydroxy-8-methyl-1,2,3,4-tetrahydroisoquinoline and acetylation gave N-acetyl-7-hydroxy-8-methyl-1,2,3,4-tetrahydroisoquinoline. Further hydrogenation over Raney nickel led to a mixture of stereoisomeric N-acetyl-7-hydroxy-8-methyldecahydroisoquinolines which was oxidized directly to the corresponding N-acetyl-7-keto-8-methyldecahydroisoquinolines. From the latter, the pure cis-N-acetyl-7-keto-8-methyldecahydroisoquinoline (*cis* refers to the mode of locking of the rings) was isolated as the crystalline monohydrate and converted by ethyl nitrite and sodium ethoxide to N-acetyl-10-oximinodihydrohomomeroquinine ethyl ester.

Reduction of the oximinoester to the corresponding amine, complete methylation by methyl iodide and potassium carbonate, followed by alkali treatment of the resulting quaternary salt gave dl-homomeroquinene, isolated as the N-uramido derivative. The free dl-homomeroquinene obtained on cleavage of the uramido group was converted by esterification and benzoylation to N-benzoylhomomeroquinene ethyl ester. Condensation of the latter with ethyl quininate, following the general methods elaborated by Rabe working with related natural materials, gave dl-quinotoxine. The racemic alkaloid was resolved through its salts with dibenzoyl-d-tartaric acid.

The pure synthetic d-quinotoxine dibenzoyl-d-tartrate had an m.p. of 185.5-186°, and showed no depression in melting point on admixture with a sample of authentic material prepared from natural quinotoxine. The synthetic dl-quinotoxine regenerated from the salt was a very pale yellow viscous oil. Conversion of d-quinotoxine to quinine was first effected over twenty-five years ago by Rabe, working with natural materials.

In 1908, the German scientists Rabe and Koenigs found out how the atoms of the quinine molecule are arranged. Over fifty years earlier, another German, Strecker, had determined that the molecule consists of 20 carbon, 24 hydrogen, 2 oxygen and 2 nitrogen atoms. In 1918, from the alkaloid quinotoxine which Pasteur had originally produced from natural quinine, Rabe succeeded in resynthesizing quinine. Woodward and Doering realized the success of their own efforts when they reached the total synthesis of quinotoxine. To achieve their goal, all that was left for them to do was to retrace Rabe's steps.

The interest of the Polaroid Corporation in the work is explained by the fact that quinine was formerly used in the manufacture of Polaroid light-polarizing materials. The company has stated, however, that the Polaroid quinine research project was not undertaken in an effort to produce a synthetic suitable for use in the production of light-polarizing material. Efficient synthetic polarizers requiring no quinine were invented at Polaroid several years ago when it was seen that the Japs might threaten the United States quinine supply. Before the war, Polaroid was among the few non-therapeutic industrial firms that used large quantities of quinine.

1871 Quinotoxine, produced earlier from quinine by Pasteur, was isolated from cinchona bark by Howard.

1908 Rabe, a German scientist, determined the molecular structure of quinine. This great work was made possible largely by formulas developed by another German, Koenigs.

1918 Starting with quinotoxine, the same product Pasteur had produced from quinine in 1853, Rabe resynthesized quinine. His work, however, is not a synthesis because his process requires natural quinine with which to start instead of common synthetic chemicals.

1931 Rabe synthesized dihydroquinine which, but for two extra atoms of hydrogen, has precisely the molecular structure of quinine. In so doing he provided another important clue which Woodward and Doering followed. He showed how two portions of the molecule of a typical cinchona alkaloid like quinine could be combined if they could be made available.

1944 Woodward and Doering are the first to develop a process for synthesizing quinine totally.

New Plant First to Produce ZEIN ON COMMERCIAL SCALE

IT HAS BEEN SAID that some day protein will rival cellulose as an industrial raw material. This may be a too optimistic prediction in view of the fact that protein molecules are still deep, dark secrets and no one really knows much about their chemistry yet. Nevertheless much progress has been made in the utilization of proteins and it is safe to say that as their intricate chemistry unravels, expanded commercial uses will not be far behind.

This belief in protein possibilities is borne out by the accelerated rate of research devoted over the past several years to the commercial production and application of vegetable proteins. One of the most recent and interesting results of this work has been the development of a process for the recovery of zein from corn.

Although discovered away back in 1821 and the subject of considerable laboratory curiosity ever since, zein never amounted to any commercial importance until after 1938. About that time companies which process corn in large quantities to obtain starch, oil, dextrose and other products became interested in the material. Ordinarily the zein had been left, along with other proteins, in gluten meal and sold as a nutritious animal feed. By extracting the zein and developing commercial outlets it could be made to serve more useful purposes.

One of these firms, the Corn Products Refining Co., put up a small plant in 1938 at Pekin, Illinois. At the time most of the interest in zein was directed along the lines of plastics and coatings for paper. Soon, however, the shortage of shellac became critical and zein found itself in demand as a replacement in lacquers and coatings. It was also found to be especially useful in grease-proof, heat sealing paper coatings, and in chill sprays for magnesium foundry applications.

As a result of this greatly increased demand Corn Products has built a plant in Pekin with several times the production capacity of the original unit.

In the patented process used in the new plant gluten meal, containing 50-55 per cent protein, is delivered from the gluten dryers in the starch extraction plant to the top floor of the zein plant by means of a Draco vacuum airveyor system. The dry gluten then goes through a screening and weighing system to a counter-current extraction system. Here, in a multiple-stage process the zein along with some oil, pigments, etc., is extracted with 85 per cent isopropyl alcohol at a temperature of about 55° to 60° C.

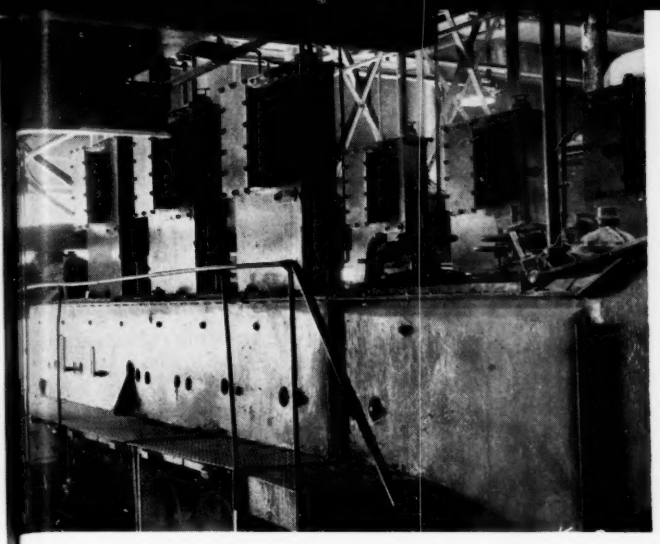
The extract is pumped from stage to stage while the meal, as a suspension in the extract is conveyed in the opposite direction. After emerging from the extractor the residual meal is still high in protein and is steamed to recover the solvent, put through vacuum dryers in the zein plant and then returned to the feed house.

The isopropyl alcohol, laden with zein, oil, xanthophyl pigments and some water soluble materials is cooled to remove certain undesirable substances and is then put through a precoat-type filter.

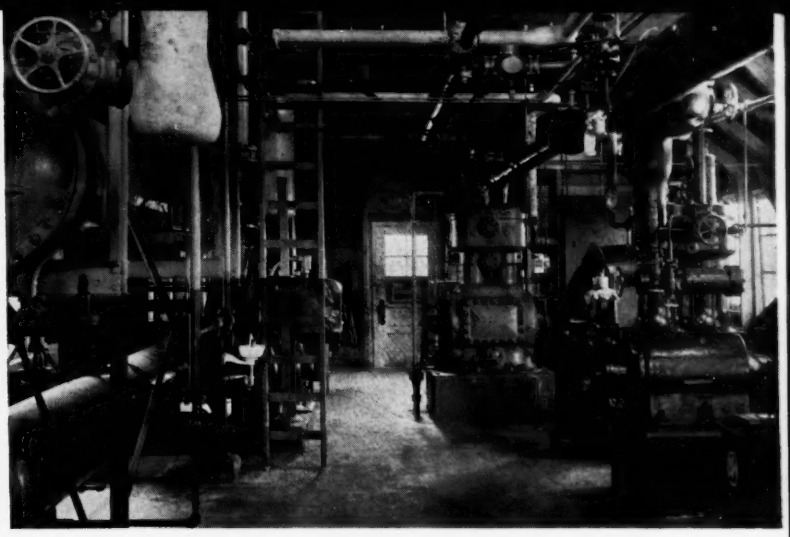
The clarified extract is next mixed with 80 to 120 per cent of its volume of

View of the Zein plant at Pekin, Illinois

Control instruments for hexane and alcohol stills



Multiple-stage countercurrent extractor



Refrigerating equipment for precipitation step

hexane. Here, through a process of selective solvency the mixture separates into two layers, the upper one containing most of the hexane, isopropyl alcohol, oil and pigment. The lower layer is made up of a 15 to 20 per cent solution of zein in 60 per cent isopropyl alcohol and contains small amounts of hexane, oil and pigment. This mixture is put through continuous high speed centrifugals where the hexane layer is separated from the zein layer. The hexane layer then goes to a separating system where, by distillation and centrifugation, the hexane is recovered and returned to the process.

The zein-alcohol solution is distilled to remove the remaining hexane and part of the alcohol, both of which are recovered and returned to the process.

The viscous alcohol solution remaining is sprayed through specially designed nozzles into a rapid current of refrigerated water, where the zein is coagulated as small flakes. The flakes rise to the surface of the water and are removed continuously by drag paddles. The zein is then partially dewatered in a continuous string-type filter.

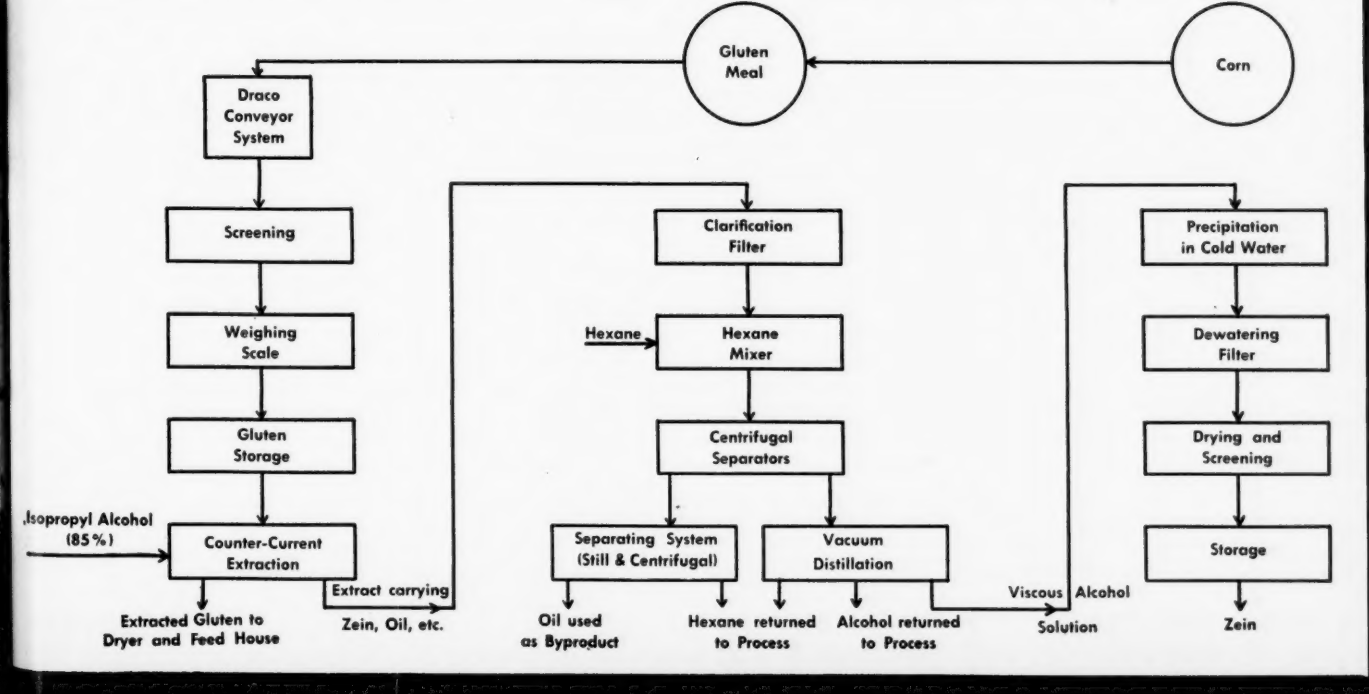
The wet cake, as it emerges from the filter is brushed into a mixer where previously dried zein is continuously added at a controlled rate to reduce the moisture content. This mixture drops directly into a hammer mill where the material is broken into particles. These are then sucked into a drying, cooling and screening system which produces the finished zein as a fine powder.

This new zein plant was completed in May, 1943 and at the present time is operating at near capacity. More than half of the output is going to the paint, varnish, and lacquer industry principally as a replacement for shellac. The remainder is being used mainly in grease-proof, heat-sealing paper coatings for military packages and in chill sprays for magnesium casting operations.

Zein applications are largely dependent on its solubility in alcohol and similar solvents and on its ability to form continuous hard, glossy and scuff-resistant films. Such films and coatings are completely resistant to hydrocarbons and to vegetable oils.

Figuring about 5.5 per cent zein in corn there would be a theoretical amount of roughly 300,000,000 lbs. of zein available from the approximately 100,000,000 bushels (56-lb).) of corn that are ground and processed annually in the United States for the production of starch, sugar and other products. Practically, however, in the present state of development 1 lb. of zein per bushel (56-lb.) of corn is considered the limit of recovery so that actually there is about 100,000,000 lbs. of zein available, based on present corn consumption.

Simplified flowsheet for extraction of zein from corn at Corn Products plant, Pekin, Ill.



Local Committee Officers confer on Cleveland meeting arrangements. Left to right: C. F. Prutton, chairman. E. J. Tauch, secretary-treasurer; C. E. Ford, vice-chairman.

A.I.Ch.E. Hears Arguments for Government "Insurance Plants"

PROGRAM ALSO INCLUDES papers on new process for chlorine dioxide ... continuous cooking and mashing of cereal grains ... isoprene by catalytic dehydrogenation.

THE ROLE of government in technological development after the war crowded more immediate problems for the spotlight of interest at the 36th semi-annual meeting of the American Institute of Chemical Engineers at Cleveland this month.

Discussion of the subject was touched off by a paper "Insurance Plants for the Chemical Industry" by Donald B. Keyes, director of the chemical section of the Office of Production Research and Development. Maintaining that it is highly essential to have the know-how in this country of all major technological developments that may be of use in time of war, Dr. Keyes advocated establishment of government-financed "insurance" plants in such cases where private industry is unwilling to take a gamble but where "the end justifies the expenditure of the people's money."

Dr. Keyes emphasized that engineering know-how can be obtained only if the development is carried through the pilot plant stage and a sample commercial plant is built and operated. "It is not necessary to build more than one sample plant unless the economies of the situation justify it," he said. "This proposal does not mean the setting up of a new governmental organization with extensive powers and vast funds, but merely co-operation between industrial concerns and existing government agencies. This is not regimentation, but just the opposite. It is the technical world, however, not industry and not government, that should promote this idea and be responsible for its success, because only the technical men will appreciate the significance of such an undertaking."

A new process for producing chlorine dioxide for industrial use was described in a paper by E. R. Woodward, G. A. Petroe and G. P. Vincent of Mathieson Alkali Works. Although a powerful oxidizing and bleaching agent, chlorine dioxide has been limited in its industrial uses because of its chemical instability, a property requiring that it be generated at the point of use. A practicable generator was first introduced in 1936, in which chlorine was bubbled through a sodium chlorite solution to give chlorine dioxide and sodium chloride. The new method treats *dry* sodium chlorite with chlorine, with advantages from a corrosion standpoint.

In principle, the new generator consists of a vertical steel cylinder lined with stoneware or glass. This is partly filled with flaked sodium chlorite, and chlorine and a large excess of air are fed in at the bottom. The highly diluted chlorine dioxide is carried out at the top by the air.

A continuous and completely automatic system for cooking and mashing of cereal grains was the subject of a paper by E. D. Unger, H. F. Willkie and H. C. Blankmeyer, of Joseph E. Seagram & Sons, Inc. In this system whole grain is continuously weighed, milled and dropped directly into a pre-cooker where it is mixed with warm water and stillage by recirculation through a centrifugal pump, retention time being about 60 seconds. The resulting mash is continuously pumped to a steam jet heater where it is heated to cooking temperature. From there it is instantly cooled to the conversion temperature, 145 deg. F., by entering tangentially into two flash chambers in series. To this cooled mash is added a continuous stream of malt mash for conversion and the entire mixture is pumped through a pipeline where it is retained for a period of 40-120 seconds to effect saccharification. In this manner all of the steam required for cooking is regenerated and re-used and no cooling water is required in the cooking process.

A selective method for producing isoprene by the catalytic dehydrogenation of isopentane, isopentenes, or mixtures thereof, was described by J. M. Mavity and E. E. Zetterholm of Universal Oil Products Co. Charging stocks having high olefinic content were said to give best results, and under the most favorable conditions yields of 80 per cent or better were indicated.

The annual William H. Walker Award was received by Olaf A. Hougen, professor of chemical engineering at the University of Wisconsin.

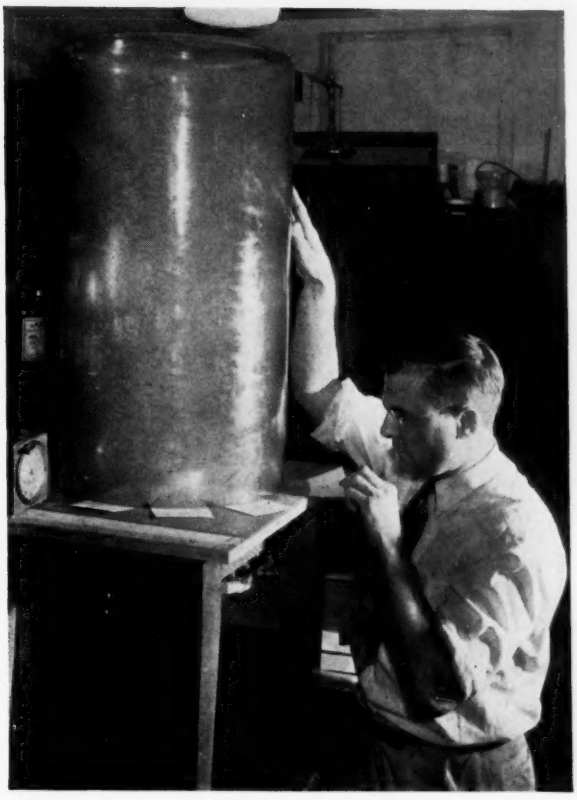
Other papers on the program included:

"Chemical Engineering Applications to Large Scale Manufacture of Vitamins," by C. V. Holland, Merck & Co.; "The Penicillin Development," by L. A. Monroe, War Production Board; "Applications of Unit Operations in the Ceramic Industries," by W. A. Koehler, West Virginia University; "Film Coefficients for Condensation of Organic Vapors on a Single Vertical Copper Tube," by E. M. Baker and H. Hipkin, University of Michigan; "Heat Transfer Equipment," by P. W. Blaylock, Shawinigan Chemicals, Ltd.; "The Solvent Extraction of Soybean Flakes," by C. O. Kind, D. L. Katz and J. C. Brier, University of Michigan; "Structure as a Variable in the Application of Diffusion Theory to Extraction," by J. O. Osburn and D. L. Katz, University of Michigan; "Butane Dehydrogenation," by C. C. Watson, F. O. Newton, E. H. McGrew, J. W. McCausland, and L. S. Kassel, Universal Oil Products Co.; "Process Development," by H. L. Barneby, Blaw-Knox Co.; "Stagewise Operations," by F. M. Tiller and R. S. Tour, University of Cincinnati; "Distillation of Ternary Mixtures: Study of the Distribution of Intermediate Components, Side Stream Withdrawal and Azeotropic Distillation," by E. G. Scheibel and E. Trueger, Polytechnic Institute of Brooklyn; "Experimental Study of Azeotropic Distillation: Use of Trichlorethylene in Dehydrogenation of Ethanol," by A. P. Colburn and J. C. Phillips, University of Delaware; "Multicomponent Fractionation: A Simplified Approach to Plate-to-Plate Calculations," by H. H. Hummel, Pan American Refining Corp.; "Studies in Diffusion: III. Unsteady-State Vaporization and Absorption," by J. H. Arnold, The State University of Iowa.

CHEMICAL SPECIALTIES

Military Needs Stimulate DEVELOPMENT of INSECTICIDAL AEROSOLS

by LYLE D. GOODHUE, U. S. Department of Agriculture, Bureau of Entomology and Plant Quarantine



The settling rate of one of the many aerosols is being determined by Dr. Goodhue.

IN RIDDING BARRACKS, TENTS, AND FOX HOLES of the disease and discomfort of insect pests, insecticidal aerosols have already justified the stepped-up research efforts that have been devoted to them. Their usefulness in agriculture, and in decontamination of factories, ships and aircraft, without interrupting regular work or service, assures them of a sound future.

AT THE BEGINNING of this war the application of insecticides by our armed forces was for the most part made by the same methods used 25 years ago in World War 1. Little attention had been given to improvements, although development of better methods for the control of many insects affecting man was recognized by those working in preventive medicine as an important problem. The control of the anopheline mosquito to prevent the spread of malaria was particularly important. Col. P. F. Russell and F. K. Knipe[1] working in India took advantage of the two-week incubation period of the malaria parasites in the mosquito and controlled this disease by killing the adult insect before it was able to spread the infection. This step placed new emphasis on the control of the adult mosquito but still the old type oil-base spray was the only available insecticide.

Even before the present emergency arose, experimental work was in progress to develop better methods of applying the spray type insecticide. Goodhue[2] and co-workers suggested the idea of eliminating liquid carriers entirely and suspending the insecticide in the air as a smoke. These smokes were called insecticidal aerosols because "aerosol"[3] is the scientific term for a smoke or fog. In this form the insecticide stays suspended and active much longer than a spray, which settles completely in about two minutes. By keeping the insecticide suspended the efficiency is greatly increased.

Several phases of this work have been described in previous publications. This paper is a summary of these with the addition of recently collected data.

Production Methods

Several methods of producing insecticidal aerosols were tried.[4] At first a concentrated solution of the insecticide was sprayed onto a hot surface (375° C.) which formed an aerosol by the volume condensation method. Mechanical energy instead of heat, as used in the "Phantomyst" machine, is another method of producing aerosols. Both of these methods require considerable equipment which is inconvenient to use or difficult to obtain. A third method employing the energy stored in a liquefied gas proved most favorable.

The principle of the liquefied gas method is very simple. The insecticide is dissolved in the liquid which is necessarily under considerable pressure, and the resultant solution released through a small orifice into the atmosphere. The sudden change in pressure allows the solution to boil violently and disperse the insecticide in the air as a colloidal suspension.[5]

The selection of a suitable liquefied gas is very important. Dichlorodifluoromethane, commonly known as freon-12, is the best of all known compounds. It is nontoxic to man and animals, non-flammable, has a convenient pressure, a low heat of evaporation, and a low surface tension. It has the disadvantage of being a poor solvent for many insecticides but a mutable solvent can be used. The development of freon-12 for refrigeration purposes is largely responsible for the success of this method.

The formula of the aerosol solution most extensively used consists of pyrethrum extract (20 per cent total pyrethrins) and sesame oil dissolved in freon-12. At first 1.0 per cent total pyrethrins and 2.0 per cent sesame oil were used. Later changes were made to conserve pyrethrum. Reduction in the pyrethrins content has decreased the effectiveness of the aerosol to flies, but steps are being taken to find other materials that may be added to correct this deficiency.

Developing a Dispenser

The preliminary work on the aerosols was done at Beltsville, and about the time the war broke out the method was demonstrated to the Army. They were shown that extremely small dosages were very effective against mosquitoes. Material

was furnished to be tested by them, and in a short time the Preventive Medicine Division in the Surgeon General's Office recognized the aerosol as an answer to a need for a good mosquito insecticide.

Our experimental equipment used for laboratory[6] tests was not suitable for the field, and from then on the development of the practical use of the aerosol became a container problem. Engineers especially skilled in the handling of liquefied gases were called in by the Army and this Bureau. In a short time a large electrical company using freon in household refrigerators developed a dispenser acceptable to the Army.

Each Army and Navy plane returning from a foreign country is immediately fumigated by the new aerosol method to destroy any insect stowaways.

Other manufacturing problems such as corrosion of the container by acidic material or water, the formation of crystals in the solution and many other difficulties have been overcome. All of these operations are new and many unforeseen problems had to be solved.

Military Uses

The insecticide in these dispensers is recommended for use on all airplanes to prevent the spread of disease-carrying insects, particularly mosquitoes. It is now used by the Pan American Airways. This compact package of concentrated insecticide is well suited for airplane fumigation. It has the advantages of being nonflammable and non-toxic to man and requiring no supplemental power or spray equipment.

For the same reasons the aerosol is well suited for use on our remote battle fronts in malarious countries. It can be used in barracks, tents, fox holes and even in the open under quiet conditions. One pound of this solution is more effective than 2 gallons of the old type fly spray and therefore the shipping space for insecticide is greatly reduced.

A very large number of one-pound dispensers have now been manufactured. To meet this great demand increases have been made in the production of freon and plant expansion is under way. There appears to have been little difficulty in obtaining enough sesame oil. The supply of pyrethrum now seems to be the only factor limiting the amount of aerosol solution that can be produced. Nearly all the available pyrethrum is going into the aerosol. Work is now in progress in cooperation with the Bureau of Mines to determine how much propane and butane can be added to freon without producing a flammable mixture. Dimethyl ether is also being tested as a diluent. Although diluents may not be needed at this time their use after the war can reduce the cost of the aerosol manufactured for civilian use.

Pyrethrum is invaluable in the aerosol and no substitute has been found for it. However, the supply can be extended by supplementing it with certain other materials.

Research Developments

Research on the physical properties of aerosols has produced much valuable information. The spraying properties of the solution are very important since the efficiency of the aerosol is dependent on how it is formed. Liquid insecticides are the best suited for use in aerosols but solids can also be applied if they are dissolved in a good high boiling solvent. Without the solvent the solid will be deposited at the spraying orifice and stoppage usually occurs. Liquid insecticides, or solutions of solids, do not coagulate as rapidly after being suspended in air and they may have a more rapid physiological action on the insect. The high boiling solvent may also increase the solubility of the insecticide in the liquefied gas.

The solubility of a substance in the liquefied gas is an important consideration. Aerosols are produced only from true solutions in the liquefied gas, not from colloidal suspensions. A pressure test tube assembly has been devised for solubility studies.[7] This piece of equipment is indispensable in work of this kind. It is as useful as the common test tube in general laboratory practice.

The particle size of the aerosol can be controlled very easily by the amount of non-volatile material included. When freon-12 is used, the optimum particle size appears to be that produced by 15 per cent nonvolatile material. Substances of intermediate volatility add to the particle size but not in proportion to the amount added. A method of determining the settling rate. which is a measure of particle size, of aerosols has been described.[5] A dyed solution is sprayed into a chamber where glass plates are uncovered at regular intervals. After the aerosol has settled completely the residues on the glass plates are dissolved in acetone and the amounts determined colorimetrically. Curves are plotted that show the aerosol remaining in suspension at any time. Comparative settling rates by this method give a good measure of the spraying characteristics of the aerosol solution.

Liquefied gases, which are necessarily held in closed containers, are present in both the liquid and gaseous phases since no container can be filled to capacity with liquid, because it would burst by thermal expansion. The saturated vapor above the liquid has considerable weight and must be taken into account when the solutions are prepared, transferred from one container to another or even during dispensing of the solution if the exact concentration is needed[7, 8]. As the solution is discharged from the container its concentration increases, until 8 per cent is gained with 9/10 of the solution removed.

The vapor pressure lowering caused by a solute such as sesame oil in freon was determined by a differential manometer method.[8] The lowering is so slight that it is of no consequence in the practical use of the aerosol. Fifteen per cent of oil reduces the pressure by only 36 mm. out of a total pressure of about 5,000 mm.

Two methods have been used to determine the density of liquefied gas solutions. One method employs a small hydrometer in the pressure test tube described above. This gives very accurate results. Another special type of pyknometer was developed for less accurate determinations. The

density of a solution is important in certain calculations especially involving the capacity of a container.

The surface tension of an aerosol solution is important. The lower the surface tension the less is the energy required to disperse the material. The viscosity is also a factor acting in the same direction. As yet, these characteristics have not been investigated in this laboratory.

Experimental Methods

Aerosols can be tested on flies[7] and mosquitoes by the Peet-Grady method. Special dispensing equipment must be used for the liquefied gas solutions. The pressure test tube described above can be calibrated and used for this purpose. The best method of calibration is to dispense a dyed aerosol solution into acetone and determine the amount actually discharged colorimetrically. This corrects for changes in the concentration of the solution in the dispenser and the loss on the walls of the tube. A more complicated dispenser is to be described in another paper.

Tests can also be made directly from the aerosol dispenser in large rooms using caged insects. By this method the aerosol is dispersed before a fan and mixed for one or two minutes before the exposure is made. The caged insects are either carried about the room or the fan is left running to circulate the air. The kill is very low unless the insecticide-laden air circulates through the cage.

Pyrethrum in aerosol form is about twice as toxic as when applied in a spray against normal flies. The rate of knockdown is slower for the aerosol. Certain procedures such as starving very resistant flies reduce their resistance to sprays more rapidly than to aerosols.

Many different insecticides have been tested in aerosol form. Among these are the thiocyanates: nicotine, rotenone and derris resin, phenothiazine, phenoxathin, DN, and many others. Most of these were tested on greenhouse insects. Nicotine[9] applied by this method is twice as effective as when applied as a burning mixture. Lorol thiocyanate[10] proved to be a good control for the cyclamen mite on snapdragons.

Home Front Uses

Some of the other practical applications of the aerosol should be mentioned. One large scale experiment showed that mosquitoes and flies can be cleaned out of a 27 million cu. ft. factory without interrupting the regular work. Next year this method is expected to be extensively tested in such large factories.

The aerosols have a good field for application against greenhouse insects. In closed spaces the aerosol can be retained longer and the greatest effectiveness is realized. Less expensive propellants than freon, such as methyl chloride, are suitable since most of the insecticides will be toxic to man anyway. Methyl chloride gave better results when lorel thiocyanate was applied against the cyclamen mite but it reacts with nicotine and freon must be used. None of the propellants are used in amounts sufficient to give a fumigating action or injure plant foliage.

Aerosols having a rapid settling rate have been tested on outdoor garden plots. Very good results were obtained, and the large scale application to some field crops appears feasible.

Fungicides are easily applied in aerosol form. Germicides for the sterilization of the air in rooms can also be applied by the liquefied gas method.[11] Considerable work has been done on germicidal aerosols produced by other methods.

Perhaps the most recent application of the liquefied gas method for the production of aerosols is in the field of plant hormones.[12] Very successful experiments were conducted in which seedless tomatoes were induced to form. Only very minute quantities of the hormone aerosols cause the fruit to develop without pollination.

Many possible applications are seen for aerosols. Some of these will be developed, while others will not go beyond the experimental stage. Whatever happens, it has already been found that the aerosol is a practical military insecticide, and if no other use is made of it, this one is an ample reward for the effort spent in the development of the method.

Entomologist Floyd F. Smith tests the aerosol insect control methods on lettuce plants of the Beltsville Research Center of the United States Department of Agriculture

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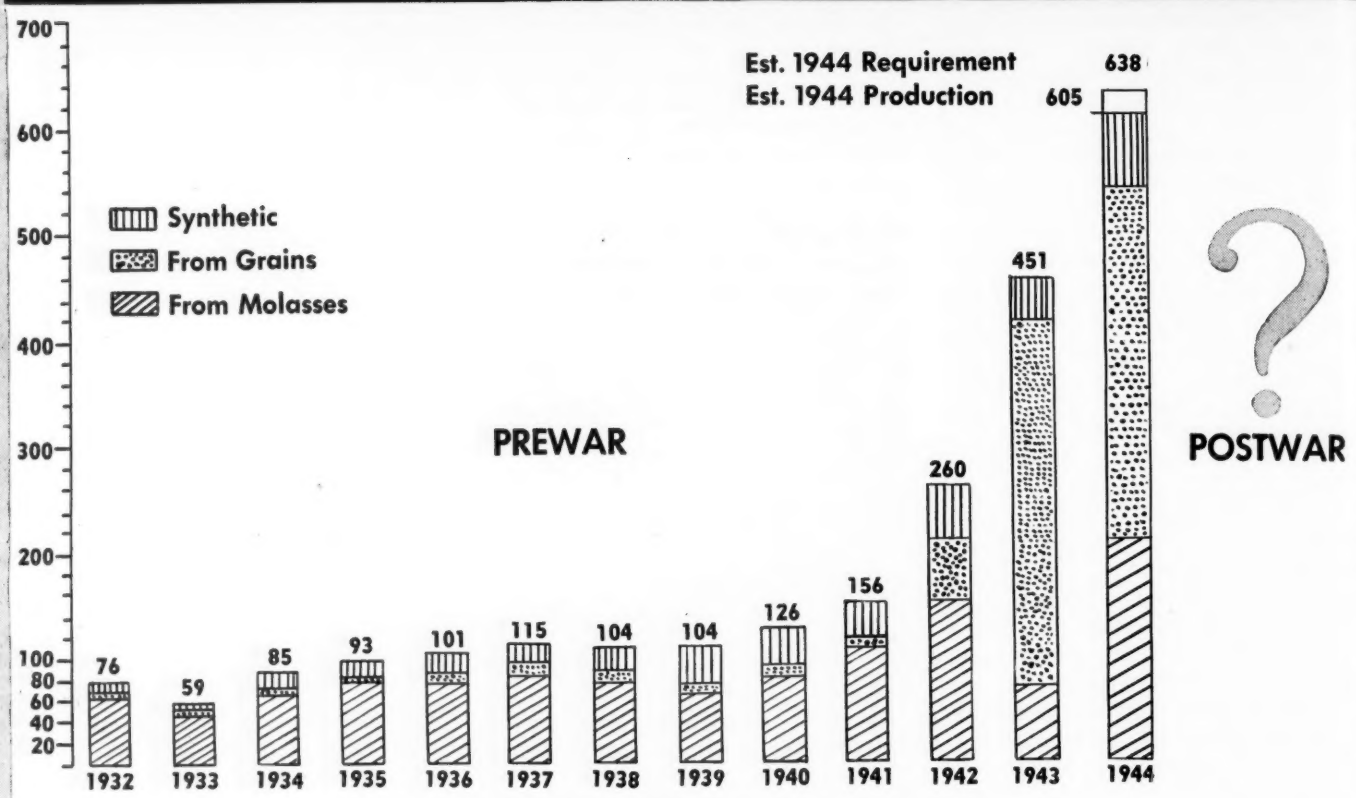
Presented at the annual meeting of the Compressed Gas Manufacturing Association, Inc., January 25, 1944, under the title "The Development and Use of Insecticidal Aerosols."

Total U. S. Production of Ethyl Alcohol
(In millions of gallons of 190-proof)



Source: War Production Board and annual reports of the Bureau of Internal Revenue.

The Postwar Outlook for ETHYL ALCOHOL

by PHILIP A. SINGLETON, Assistant to the President, New England Alcohol Co.

THE ALCOHOL INDUSTRY is playing a vital role in the war effort and consequently production has been increased tremendously. This naturally gives rise to speculation on what will happen in the industry after the war. In March we digested a U. S. Tariff Commission report on the past, present and future of the industrial alcohol industry. This month Mr. Singleton discusses the postwar supply and demand picture.

THE ALCOHOL INDUSTRY is in a better position to withstand cut-backs than would appear from a superficial consideration of current 610 million gallon output as against normal pre-war operations in the range of 100-150 million gallons annually.

It seems quite clear that beverage plants will revert at first opportunity to their more profitable liquor operations, thus providing an easy cut-back of at least 240 million gallons capacity. Further, the Government grain alcohol units located in the Midwest will (in the absence of Federal subsidy program) be high-cost producers and the logical units to be shut down first as they were erected solely as war plants. This leaves a remaining capacity of approximately 350 million gallons annually. Can this be absorbed?

Postwar Alcohol Demand

Because ethyl alcohol is a basic organic raw material, it seems likely that increasing new uses for it will be found in the chemical industry, such as the production of synthetic organic acids and similar end products, based on ethyl alcohol as raw material. The pre-war uses of ethyl alcohol as an industrial solvent, in pharmaceuticals, in plastics and protective coatings, were all of a fairly basic nature and may reasonably be expected to carry along at approximately the same levels as before the war with a possible limitation regarding anti-freeze which has found increasing competition from other materials.

Because of its flexibility in being able to use more than one source of raw ma-

terial, the ethyl alcohol industry, with both a synthetic and natural raw material base, should be able to adjust itself fairly reasonably to increased demand (aside from the bigness of the synthetic rubber program) by supplementing final blackstrap with invert molasses from cane, though with off-setting necessary adjustments in price upward if necessary to the price of sugar as a top limit. In such a case, the question would be, of course, whether the demand would be sustained if ethyl alcohol prices should rise unduly or if instead other substitutes might be used in preference.

Synthetic Rubber

This is the biggest ponderable. It accounts for 57% of current peak output. The 347 million gallons demand for synthetic rubber is more than double the total normal USA pre-war alcohol production. So long as synthetic rubber stays in the picture (either because the East Indies plantations remain in enemy hands or if economic or diplomatic developments justify continuation of synthetic rubber in its own right) the demand for synthetic rubber will more than utilize existing synthetic alcohol and molasses alcohol capacity, and still call for the operation of the "marginal" higher cost plants utilizing grain as raw material. This is, of course, hinged on continuation of alcohol as raw material for butadiene. Expansion of butyl rubber, or butadiene from petroleum or grain directly would force a serious "cut-back" in alcohol demand, the magnitude of which cannot be predicted now inasmuch as it depends upon (1) possible unforeseen technological innovations, and (2) whether the Government may insist on the grain alcohol process, aside from cost economics, as a means of liquidating its investments in plants.

Synthetic Alcohol

During the war, synthetic capacity has been increased from 37 to 75 million gallons annually. If the USA were to revert to pre-war production levels 75 million gallons would account for about one-half of our national demand. No data has been published on synthetic alcohol production costs, but these are generally presumed to be low, the prime factor being a heavy capital investment rather than the raw material cost (since ethylene gas is a waste by-product). Future expansion of synthetic alcohol production could cause ruinous competition for fermentation alcohol producers unless they can get low-cost raw materials, except for the important possibility of off-setting cost credits from fermentation by-products, which will be discussed later. However, synthetic alcohol producers may prefer to carry ethanol so produced through to more profitable end-products rather than move in to a field that has been highly competitive anyway, and which could produce a fairly sizable annual production estimated at 90 million gallons made from low-cost molasses alcohol provided the blackstrap molasses (which if not used must be disposed of by dumping because it is a nuisance) is available at a sufficiently low price (the bare minimum being handling and tanker rates only from the West Indies in the range of 1½c per gallon or 3.7c per gallon of alcohol in addition to prices paid for the by-product itself, and conversion costs).

Cuban Alcohol

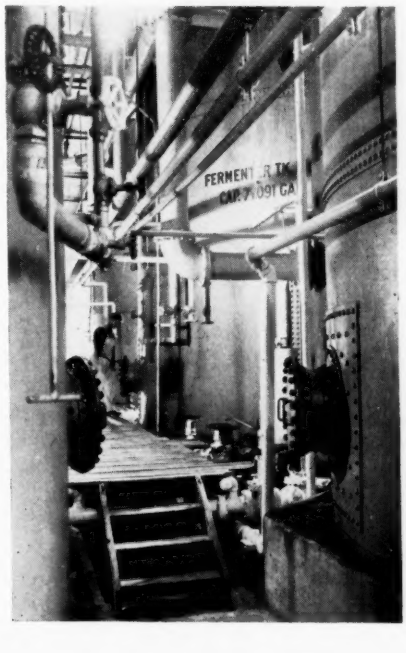
Action by the Cuban government on alcohol motor fuel blends will have considerable bearing on molasses outlook. During the war Cuba has built up her industrial alcohol output from 6 to 10 million to an estimated 34 million gallons annually (based on 85 million gallons of blackstrap earmarked for motor fuel) for the year 1944.

More molasses will be required for the Cuban national motor fuel "carburante" under the provisions of a Presidential Decree of November 3 which changes the prescribed formula for this fuel from 65% alcohol and 35% gasoline to 75% alcohol and 25% gasoline. The announced purpose of this order is to keep "non-essential" consumption of gasoline within the basic quota of 40% of the 1941 consumption. The price which distillers may charge for alcohol used in the production of motor fuel has been reduced from 35c to 33½c per gallon.

Postwar expansion of this local industry in order to displace prewar imports of gasoline for which Cuba depended upon American oil companies, has recently been intimated in the course of negotiations for the 1944 sugar and molasses crops. This is not impossible from an equipment standpoint. The threat would not be to the USA alcohol market in which Cuba is at a 12c per gallon tariff disadvantage. Rather, the threat is to the USA's main source of molasses for alcohol.

However, it seems likely that Cuba would not wish to cut herself off completely from dependence upon petroleum, for alcohol products are not lubricants nor are they a cheap fuel for industrial heat and power. Hence, it seems more than likely that a satisfactory compromise will be obtained which will give Cubans the advantage of USA gasoline as well as oil, and permit her to export her by-product blackstrap molasses, and "invert" from extra acreage sugarcane, as in the prewar period.

Molasses fermenters.



Sugar

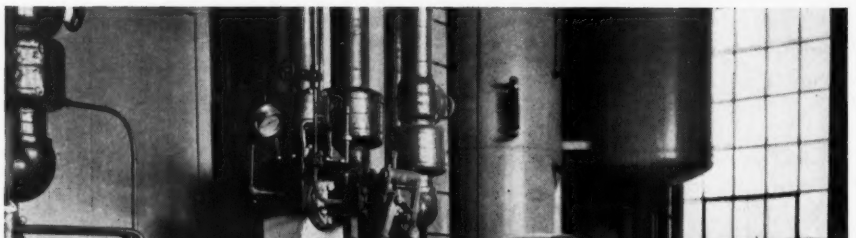
There is here an interesting inter-relationship between three basic industries, cereal-grains, sugar and petroleum—all bearing on alcohol demand and price.

On February 25, civilian and industrial sugar allocations were cut 6 to 10% for the year 1944. One reason given was the diversion of Cuban sugar to invert. It is hinted that further cuts in allowances may become effective before the end of the year and some independent observers say that we are drawing near to a sugar shortage that cannot be relieved before the end of 1945 or possibly still later. There has already been concern in Congress as evidenced by recent appointment of Ellsworth Bunker by OPA to determine whether grain or sugar could be better spared for war alcohol.

With present thinking about international peace, it seems quite likely that the UNRA's large-scale disbursements of food to needy nations may place a great demand upon the capacity of Allied nations supplying the necessary produce including sugar. The importance of this factor is compounded by the likelihood that hostilities will cease in Europe before we can hope to restore normalcy in the Pacific. Hence, the UNRA and its disbursement program will be minus the important sugar producing facilities of Java and the Philippines.

According to O. H. Lamborn, President of Lamborn & Company, the day may soon come when those who advocated restricted sugar production may reverse their position. It is, he feels, as clear as crystal that it is impossible to produce in the United States and the West Indies enough sugar to satisfy the 1945 and 1946 needs of allied nations.

It has been shown that sugarcane is a crop more "efficient" than grain from the standpoint of producing gallons of alcohol



Dry ice is an important byproduct of alcohol production.

per acre planted. Hence, if an international shortage exists and the question is reopened as to which material can best be spared, namely grain or sugar, additional sugarcane acreage would seem the logical answer. The only proviso is the minimum of at least two years delay in getting production from *gran cultura* plantings, and the difficulties in securing extra acreage in suitable climate, both of which should not prove insurmountable obstacles provided the program were undertaken without undue delay. For, by comparison, there is also the distinct problem of "marginal land" hence higher-cost, less efficient production, and at least a one-year delay in substantially expanding grain output.

If cane acreage is to be expanded, several avenues seem open, the foremost being improvement of conditions within our own United States territories, of which Puerto Rico is the most immediate problem. The House Insular Affairs Committee has recently concluded, "the current situation is causing sugar interests to pull out of the island rapidly. The only way to stop this and retain Puerto Rico's major industry is to stabilize the Government. This must be done." Rather than cause these sugar producing firms to migrate, as reported, "to Florida, Cuba, or Central American countries," the first step should be to assure against this loss of immediate current production, rather than having to look elsewhere for additional output, as a substitute for it. The need for stable Government is a basic pre-requisite. Adequate labor and agricultural materials are specific needs that must be met.

A substantial additional output of sugarcane from present plantations seems reasonably possible, especially if various governmental regulations in the respective countries could be modified inasmuch as sugar production has been generally limited on a "quota" basis. In almost every Caribbean Island some cane has been left standing at the end of the crushing season. Further, many West Indies producers have been severely handicapped because of unobtainability of suitable fertilizers, and labor shortage occasioned by hiring of labor for military projects which have been deemed more urgent. It seems likely that both of these conditions can be remedied concurrently now that dry cargo vessels for fertilizer are becoming comparatively more obtainable and secondly, that much of the defense project construction in the West Indies has been completed, hence making possible restoration of labor rates and demand to normal conditions.

Further Expansion

Viewing the problem broadly, and recognizing that what virtually amount to colonization problems would be necessary in such activities, the tropical areas in Brazil offer perhaps the most promising field for future expansion over her present production for domestic needs, despite a relatively small freight rate disadvantage. Peru is already a sizable producer and exporter, and may be reasonably expected to provide some additional output if called upon to do so, although she is considerably limited by irrigation problems.

The use of sugarcane coupled with budgeted future purchases of sugar for relief to needy nations would afford additional blackstrap for alcohol and a desirable flexibility in the overall Government program inasmuch as invert molasses, the more efficient raw material for alcohol, could be allocated at the same time UNRA entered into its purchase contracts for cane sugar.

Low Cost Molasses

Atlantic Seaboard molasses alcohol plants need this to stay in business. Sale of by-product molasses alone has never been a large factor in the income of sugar companies and if molasses is made available to Atlantic Seaboard producers at sufficiently low prices they should be able to stay in business despite synthetic alcohol competition. By adjusting prices, sugar firms will assure themselves a steady market for convenient disposition of the by-product blackstrap which would otherwise be a nuisance. After all, the main interest of sugar companies is sugar, not molasses. That the current 16.8c per gallon level on blackstrap cannot be maintained seems to be generally conceded.

Reversion of USA beverage plants to liquor production may have some bearing on the quantities of molasses obtainable. During the war, there have been sizable expansions of West Indies rum and gin production, largely because of ready market for liquor of any kind. The Cuban distillers get $1.30 a gallon for beverage alcohol exported to the United States for blending with whiskey, as compared with the 33½c a gallon they get for the alcohol mixed with gasoline to make "carburante" for fuel. Significant quantities of molasses have been diverted to liquor production, which amounts to an estimated 26 million proof gallons in Cuba and 15 million proof gallons in Puerto Rico. When competition re-enters the picture, sales in the USA of the West Indies products may slacken in favor of domestic liquors, with the possibility of return of the corresponding raw material to the industrial alcohol industry.

Motor Fuel

This is a "hardy perennial" in all discussions of the alcohol industry. Government policy, not economic factors, will provide the answer. The use of alcohol for motor fuel in other countries has been largely a matter of subsidizing local industry and making local economies self-sustaining by eliminating dependence upon gasoline imports. In the USA with its vast petroleum resources, the case must be argued on entirely different grounds, namely,

(1) a means of utilizing farm surpluses, or

(2) alleged conservation of petroleum to avoid depletion of our oil fields.

The conservation aspect is precluded almost completely by present magnitude of USA motor fuel requirements which are now so big that any contribution that the alcohol industry could make through substitution of alcohol from grain, would be of minuscule proportions. For example, taking the entire all-time "high" in USA alcohol production of 610 million gallons annually and using all of it for motor fuel would permit less than a 3% substitution for gasoline on a gallon per gallon basis, with no provision for the amount of alcohol that would have to be subtracted for vital industrial and civilian uses.

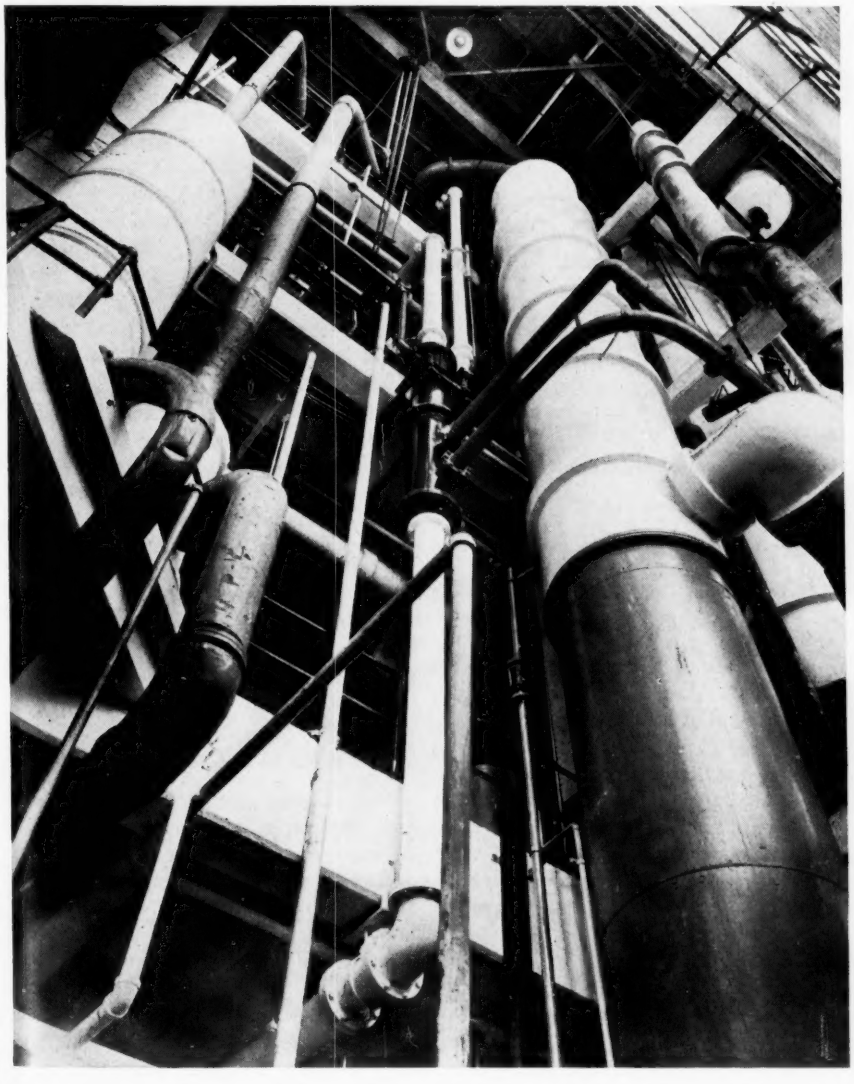
From the standpoint of salvaging farm surpluses, this could quite readily be done, utilizing the existing government grain alcohol plants. Although the capacity of the United States to produce grain is great, and it might be increased by several hundred million bushels, the contribution to the motor fuel picture would still be insignificant. To substitute alcohol on a gallon for gallon basis would require 10 billion bushels of grain, which is about twice the world's production of corn, and about 1.6 times the world's production of wheat. Hence the question resolves itself completely down to farm subsidy on which there seems to be wide diversity of views at present.

The conclusion is that any national substitution of alcohol for motor fuel in the USA would be so big a demand that any sliver of it would be a tremendous "jolt" or "lift" as the case may be, to the alcohol industry. It is submitted that current grain and molasses alcohol output are both proportionately so small by comparison to the 25 billion gallon motor fuel demand that the program should rest squarely on its own feet as a government subsidy action, rather than be clouded with petroleum conservation aspects which appear to be of rather insignificant proportions. The *Wall Street Journal* recently notes that optimistic geologists estimate exhaustion of oil resources (including shale and oil-bearing sands) in the year 3026 A.D., the pessimistic variety settling for 2876 A.D. Much can happen in the field of technology before either of these milestones are reached. Viewing development in the last 932 years, if seems reasonable to presume that long before 2876 A.D. we shall have found compounds and methods of utilization that will have outmoded current gasoline demand in the same way that it has displaced earlier sources of energy since the days when our sole interest in liquid fuel was for illumination and house heating.

Technology

Some improvements in yield of ethyl alcohol per pound of raw material may be expected, but it seems generally conceded that these will be of relatively small magnitude because the technology of fermentation and distillation is reasonably advanced and yields are already approaching theoretical maximum. All such economies are important insofar as measuring the profitability of alcohol plants but from the standpoint of consumers, could not effect cost savings greater than in the magnitude of a range of 1c per gallon of alcohol inasmuch as molasses conversion costs are relatively low and in general, raw material is the primary cost component in natural ethyl alcohol.

Alcohol recovery columns at molasses distillery of New England Alcohol Co.



By-Product Recovery

Very promising however is the field of by-product recovery. Much work has been done on this in wartime and practically all alcohol producers and various Government stations and technical institutions are researching heavily.

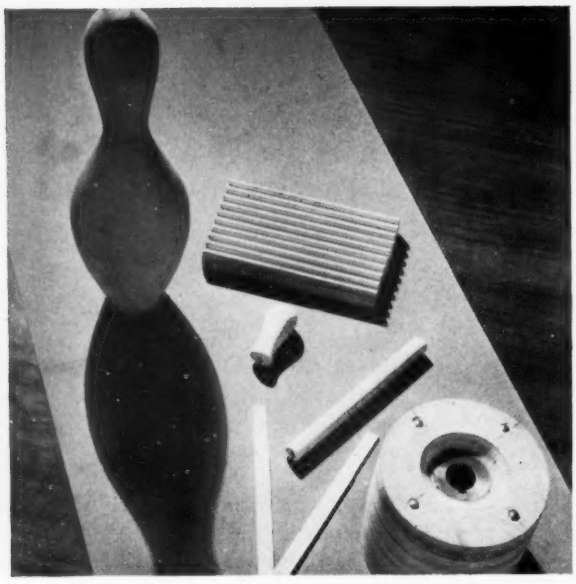
An example is the recent establishment of a $125,000 Sugar Research Foundation sponsored by sugar producers for the purpose of setting up a five-year research program at M.I.T. to extend knowledge of the role of sugar and other carbohydrates and to discover new industrial uses for sugar and its derivatives.

Such programs, by both sugar and alcohol producers, will be their strongest bulwark in the face of synthetic alcohol competition and possible expansion despite its disadvantage of heavier capital plant investment.

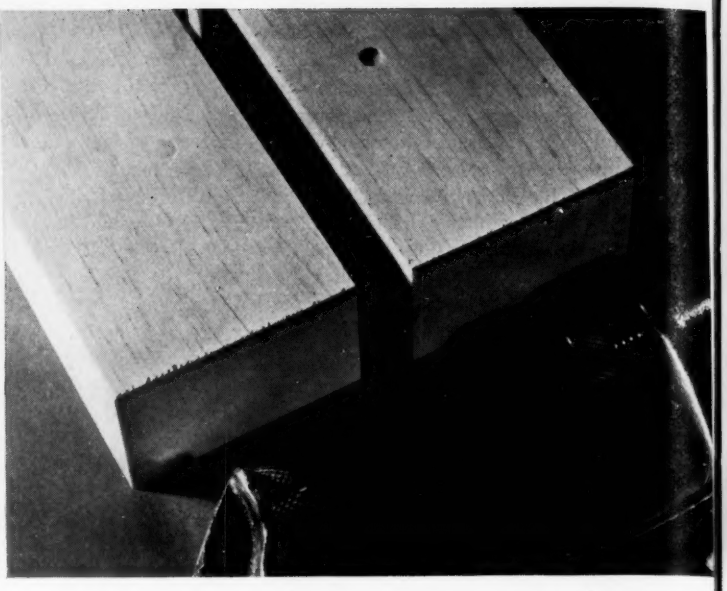
Vitamins, carbon dioxide recovery, protein, cattle-feed, and enriching agents all are examples of a wide variety of new developments that offer hopeful opportunities for cost credits from byproducts that will contribute substantially to the profit picture on fermentation ethanol production and hence mean lower possible prices to consumers. Fermentation directly to new end products other than ethyl alcohol is also a hopeful prospect.

Intelligently planned research has brought the American chemical industry this far, and it is hoped that it may continue to serve as a beacon for future growth and development.

This article based on conclusions presented by the author at the National Farm Chemurgic Conference, St. Louis, March 29.



The methylolurea treatment is applicable to numerous articles made from wood, such as bowling pin, filter frame section, and roll core.



Wood block treated with methylolurea is markedly harder than the matched untreated piece, as indicated by "C" clamp indentations.

METHYLOLUREA Advances Resin Impregnation of Wood

by J. F. T. BERLINER

Ammonia Department, E. I. du Pont de Nemours & Co.

CHEMICAL SPECIALTIES

DIFFERING FROM OTHER METHODS OF IMPREGNATION, methylolurea enters the wood as a water soluble uncondensed material. It gradually reacts with itself and with components of the wood during drying, first forming insoluble but fusible products, then an infusible product that can be worked and milled.

THE CHEMIST once again has improved on nature through a new and outstanding development, the methylolurea treatment of wood This chemical accomplishment is of real importance to this country at war and at peace. It is of significance not only to industry but to people in every walk of life.

Methylolurea is a term used to designate dimethylolurea as well as the series of compounds resulting from the addition of varying amounts of urea to dimethylolurea. While urea has long been an article of commerce, dimethylolurea has but recently become available on an industrial scale.

Many materials and processes have been considered for the impregnation of wood to minimize swelling, shrinking, and warping and to improve its hardness and strength. Resins, partial resins, resin-forming chemicals, salts, sugars, a host of other chemicals, even gases, have been tried. Of all substances investigated, methylolurea thus far has proven the most generally useful and practical.

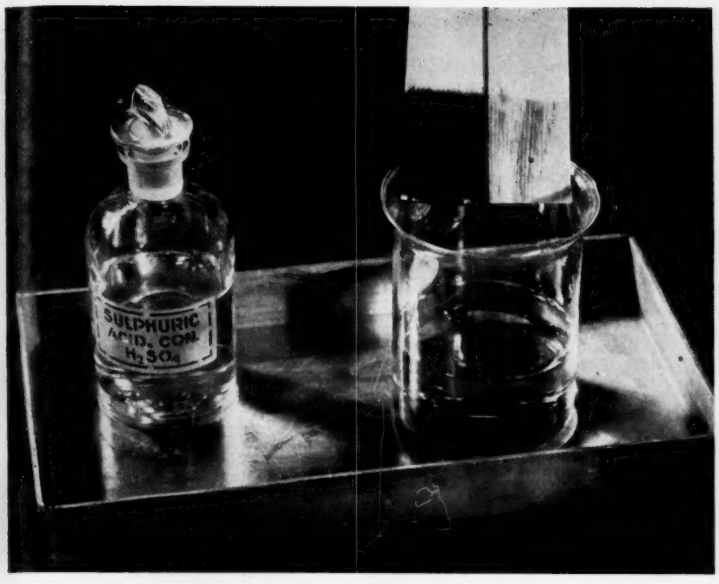
Methylolurea can react with itself under certain conditions to form hard, water-insoluble, infusible resins. It also can react with the components of wood, and the properties are profoundly altered when the methylolurea is converted to resin.

When sufficiently treated, the wood loses its natural tendency to swell or shrink or warp with humidity changes, nor will the grain rise on wetting. The wood becomes markedly harder, stronger, stiffer and more durable. It can be highly polished and more smoothly worked. Its tendency to shred and splinter during sawing, planing, cutting and turning is reduced.

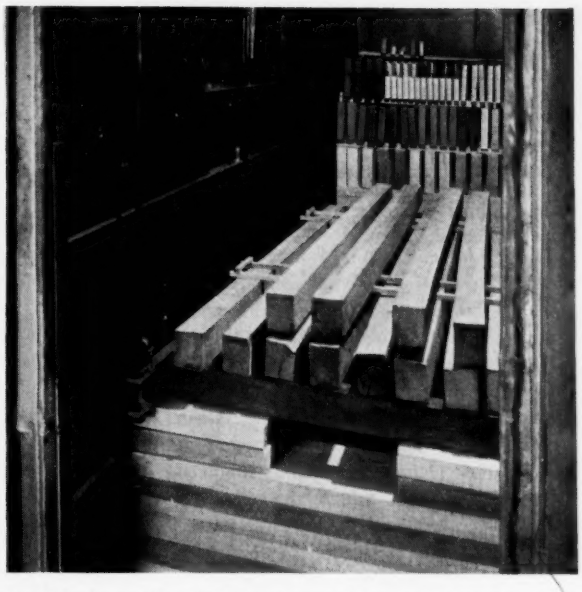
The natural color of wood is not altered by the treatment. However, suitable dyes may be introduced with the treating chemicals, and the wood colored throughout. For instance, a light colored pine or poplar can be given the color of cherry, rosewood or mahogany, or colored brilliant red, green or purple, according to one's wishes.

Resin Formed in the Wood

Methylolurea enters the wood structure as a water soluble uncondensed material. In the course of drying the wood, the methylolurea gradually reacts with itself and with the components of the wood, first to form insoluble, but fusible products. Given sufficient time or heat, the reaction is completed and an infusible product results. If the wood is subjected to sufficient heat and pressure while the resin is still in the fusible stage, the resin



Oxidizing effect of concentrated sulfuric acid on untreated and treated wood is shown here. The treated piece is free of charring.



Drying chamber at Du Pont Experimental Station Laboratory where heat accelerates polymerization of resin formed by methylolurea in wood.

will melt, flow and allow the wood to compress. This treatment converts the resin to the final infusible form, maintaining the wood in the dimension resulting from the press. Thus, treated wood may be compressed to produce a stable, extremely hard, dense product with a consolidated closed surface requiring no filling, sanding or polishing. It is possible to apply moderate pressures sufficient to compress and consolidate only the surface or outer zone of the treated wood to produce a finished, hard surface. Thus, an item may be treated and then brought to the desired final dimension by heat and pressure. If polished or embossed platens are used, these finishes are reproduced on the surface of the wood.

When veneers are sufficiently impregnated and dried, they become self-bonding under the heat and pressure of the presses and no other adhesive is required to form plywoods. The heat fuses the resin formed in the wood, resulting in a hard, dense product.

As far as is now known, the treatment does not have any adverse effect on the gluing and finishing characteristics of the wood. Flame resistance is improved and the wood is also more resistant to fungi, rot and pest infestation.

The resin formed in the wood has no odor, is not toxic, is not affected by organic solvents or water, and does not affect the color of the wood. The resistance to the action of most chemical agents is markedly improved.

It is also possible to impregnate sawdust, shavings or similar wood wastes and form them under heat and pressure into molded objects. Dyes or pigments may be included. The process is also applicable to other cellulosic and fibrous products such as paper, cotton, farm wastes, leather, and the like. Bamboo and similar cane and fiber products can be treated.

The Process

The impregnation of wood with resin-forming methylolurea and the conversion of this chemical to resin within the wood is relatively simple and inexpensive, involving no new procedures or new or special equipment.

A water solution of, an uncondensed methylolurea is forced into the wood structure. The methylolurea is there converted to resin by the natural acids present in the wood. Heat, such as in normal kiln drying, speeds the conversion of the methylolurea in the wood to water insoluble resins. However, this process takes place with sufficient rapidity at normal temperatures to be completed in the usual air drying period. A permanent resin that is both hard and insoluble is developed within the wood structure either at normal or at kiln temperatures. If the kiln drying has not been at too high a temperature or if conducted rapidly enough, the resinification reaction will proceed to the insoluble but still fusible stage and will remain so for a period of time. If wood so dried is heated to 240° F. or higher, the resin fuses and will flow under pressure and the resinification is rapidly completed to the infusible state. The wood will permanently retain the dimension and surface produced by the compression.

The solution may be impregnated into wood by various means. Perhaps the most effective commercial procedure to impregnate wood uniformly is the so-called "full cell" or vacuum-pressure impregnation process. The wood is placed in a chamber and the air withdrawn. The treating solution is then introduced into the evacuated impregnating chamber in sufficient quantity to cover the wood and allow for the volume of solution which will be absorbed. The chamber is then opened to the atmosphere, or air pressure applied. After a determined period the solution is drained off and the wood removed for drying. For small items, centrifugal impregnation may warrant consideration.

The concentration of the methylolurea in the solution, the particular methylolurea used (that is. the proportion of urea to dimethylolurea), the temperature, what pressure, if any, is applied, and the length of each phase of the treating cycle, are conditions that depend on the nature of the item being treated, its dimension and species, whether of sapwood or heartwood, what degree of treatment is necessary, and what final properties are required.

The vacuum-pressure treatment involves the following steps:

1. Place the wood in the treating cylinder.
2. Apply vacuum for the required period.
3. Introduce the solution without releasing the vacuum until the wood is completely submerged and the solution is in the overflow tank.
4. Apply pressure for the required period.
5. Discharge solution into reservoir for re-use and remove wood.
6. Dry the wood.

For most veneers, up to 1/16", it is not usually necessary to apply pressures above atmospheric to obtain adequate absorption. For deep penetration of lumber, pressures of 50 to 100 pounds or more per square inch are required. For sap-

wood of both softwoods and hardwoods and the heartwoods of some hardwoods, an impregnation cycle of 20 to 50 minutes vacuum (26 to 28 inches) followed by 100 pounds per square inch pressure applied for 10 to 50 minutes at room temperatures, is usually sufficient.

The Equipment

The equipment required may be quite simple. It can be of the same type as now used in treating lumber with creosote and flameproofing chemicals, though because of shorter treating cycles, smaller scale equipment may be used. For test purposes or small scale operations, it can usually be assembled from equipment at hand in most plants. All that is required is a chamber into which the wood is placed, capable of withstanding the necessary vacuum and pressure. A steam jet ejector is an effective, simple means of producing the necessary vacuum. It should be equipped with a pressure door or removable head and a source of vacuum and of pressure. A tank for preparing the solution, an auxiliary overflow tank, and means for drying the wood are also needed.

The Chemicals

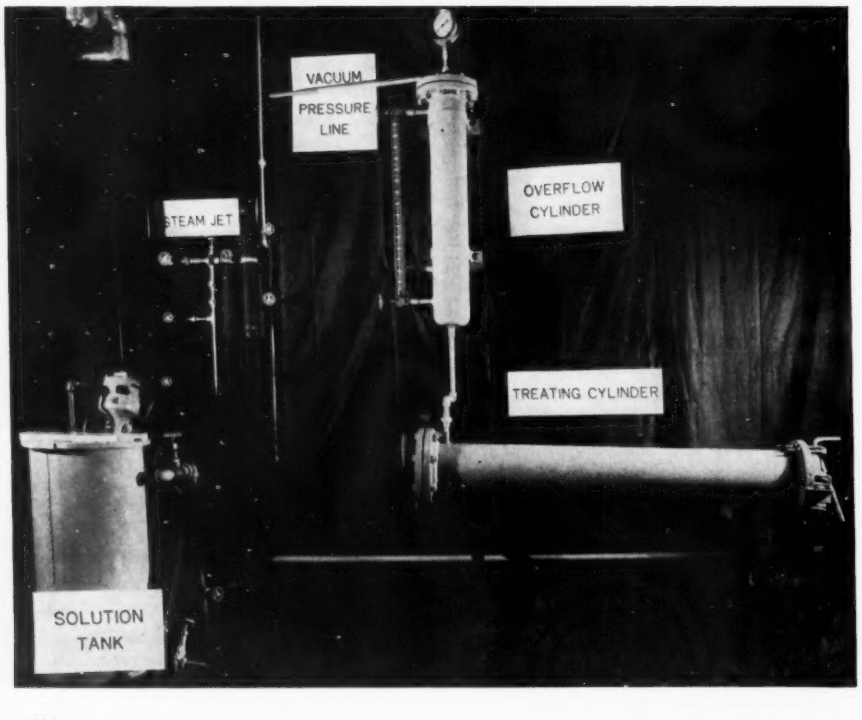
A water solution of an uncondensed methylolurea is employed. This may be obtained by reacting urea and formaldehyde in the proper proportions and under controlled conditions. However, a simpler, more economical and convenient method of preparing the solution is merely to dissolve urea and dimethylolurea (or for brevity, DMU) in water in the required proportions. Both materials are white, water soluble solids. They are produced from ammonia, carbon dioxide and methanol. Urea results from the reaction of ammonia and carbon dioxide. Formaldehyde, which is derived from methanol, condenses with urea to form DMU.

The proportions required will depend somewhat on the nature of the item being treated and the results desired. For most purposes a solution of 1 to 2 parts of urea and 6 parts of DMU dissolved in 20 to 24 parts of water is satisfactory.

Methylolurea solutions are highly reactive as evidenced by the reactions that ensue when they are impregnated into wood. Certain precautions are therefore necessary to prolong their usefulness and prevent spoilage. If the solution is to be stored for more than eight hours, it is important that it be maintained mildly alkaline, at a pH of about 8.0. When freshly prepared from urea and commercial DMU, the solution will have approximately the desired alkalinity. When wood is impregnated with this solution, wood acids are extracted and the solution tends to become acidic. In operation, the solution may be allowed to become slightly acid (pH not less than 6.0) if promptly neutralized with alkali avoiding an excess (pH not above 9.0).

If the wood is to be colored by the treatment, water soluble dyestuffs are added to the treating solution. The color produced by the dye is apparently not affected by the methylolurea. The dyes selected should have a neutral or slightly alkaline reaction in solution.

Experimental unit for treating wood with methylolurea. Wood placed in treating cylinder, right, is impregnated with a solution of methylolurea from tank at left by a vacuum and subsequent application of pressure inside cylinder. Overflow cylinder at top center is reservoir for chemical solution, and gauge indicates progress of absorption. Steam jet creates vacuum.



Both urea and DMU are commercially available and inexpensive chemicals, now being produced on a large scale. Both materials are under allocation by the War Production Board. However, in the small quantities required for investigation and preliminary tests they are available without formal allocation.

Costs

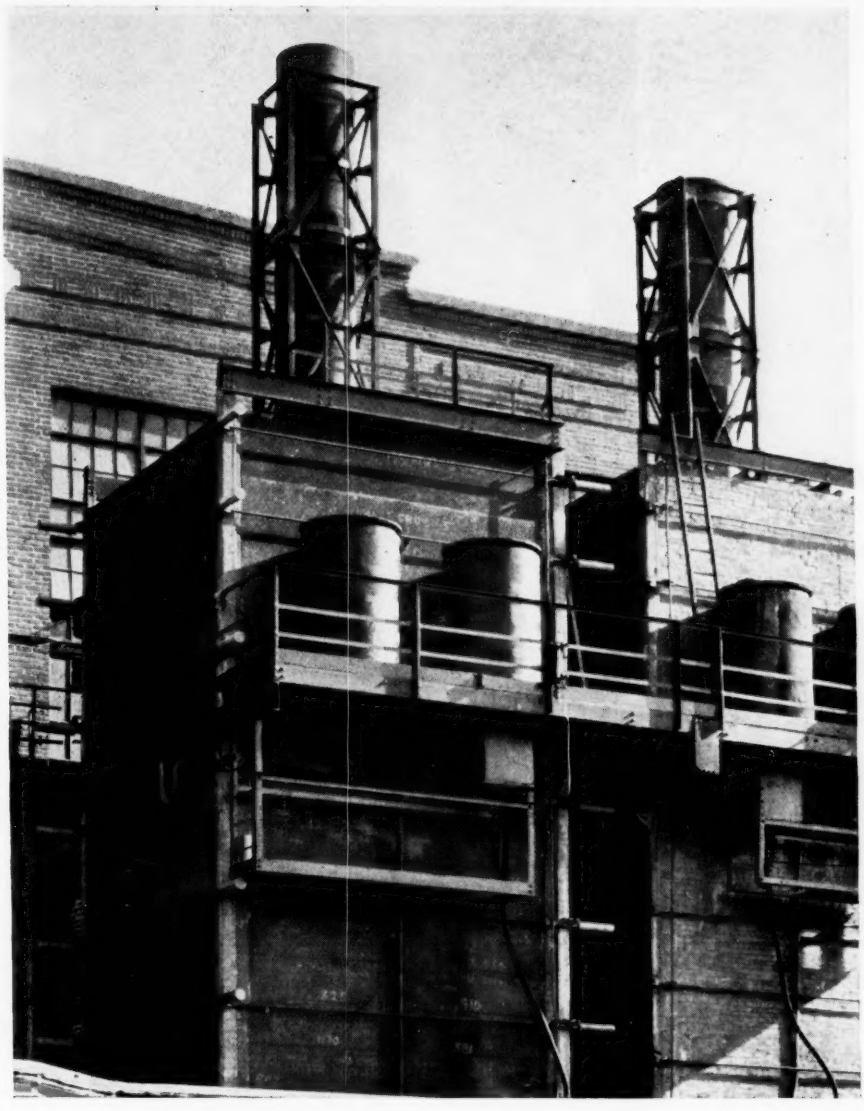
Fundamentally, the costs of this treatment of wood are low. The cost of the chemicals, operation charges, and investment in equipment are moderate and in many instances the cost of treatment may be more than balanced by the resulting advantages and economies.

The direct costs depend on a number of factors such as the scale of operation. The cost of chemicals varies with the amount used. This depends on the type of lumber or item being considered and the purpose of the treatment as this governs whether the wood is to be fully or partially impregnated. Commercial woods grown in the United States vary in weight from about 24 to 47 pounds per cubic foot. Exclusive of timbers, structural parts, and other items which would only be surface or case-impregnated, the application of chemical varies from 10 to 30% of the dry weight of the wood. Thus, one may require from 2.5 to 14 pounds per cubic foot of wood. For average requirements, applications of 15 to 25% would suffice. This represents a dosage of about 5 to 6 pounds of methylolurea for the average wood weighing about 30 pounds per cubic foot. The present cost of the chemicals is 8 to 9 cents per pound at the mill in small quantities. Thus, the cost of chemicals for the complete impregnation is of the order of $0.035 to $0.045 per board foot of lumber. For the average veneer, this cost is about $0.0015 per square foot.

Where it is desired to limit the treatment to the outer zone of the wood, the chemical cost would be from $0.003 to $0.02 per board foot.

Significance

This development means that it is now practical and feasible for wood to be remade—engineered to specifications of service and appearance. The shackles of unalterable properties and of limitations to certain species can now be cast aside. This new substance, transmuted wood, that is made from wood and looks like wood can successfully compete with plastics and metals that for several years gradually have been pushing wood into the discard for many purposes. Plastics and metals were fashioned to the conditions demanded of them, even to looking like wood. Now wood can be formulated for greater interchangeability and to achieve fields of usefulness extending well beyond the frontiers to which it has hitherto been limited.



PLANT OPERATION

All-carbon electrostatic precipitator. The entire structure of this tower, including the support beams for the tube sheet, is made of carbon.

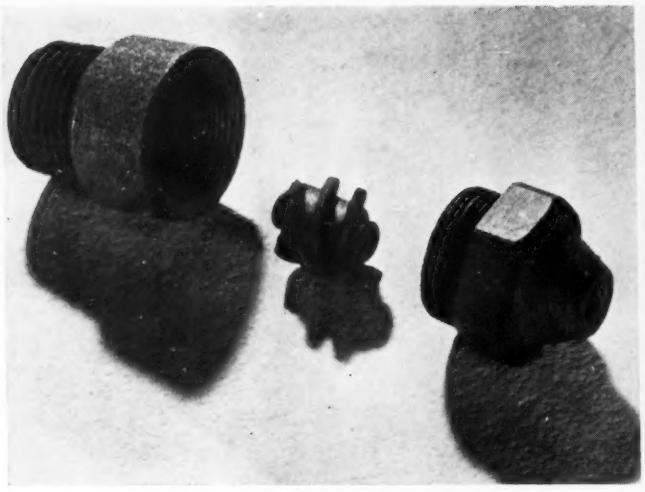
Recent Developments in CARBON CHEMICAL EQUIPMENT

by C. G. OLLINGER, National Carbon Co.

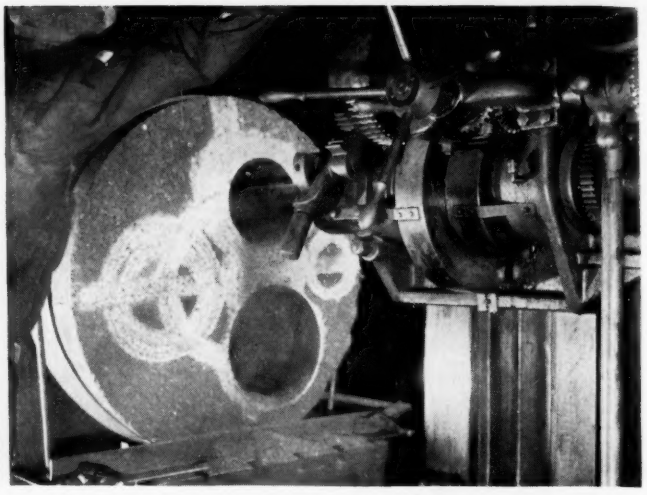
CARBON AND GRAPHITE have made a permanent place for themselves as materials of construction in the chemical industry by virtue of their resistance to extreme corrosion and temperature conditions. New forms, new structural shapes, and new fabrication methods have greatly increased their utility and versatility over the past few years.

BECAUSE structural carbon and graphite products combine singular physical and chemical properties, good machinability, and low cost of construction, they have become important and often essential, structural materials in the chemical industry, making possible the successful performance of many recently developed processes.

The number of uses for carbon structural materials has increased by leaps and bounds in the past few years. The first major application of carbon as a structural material was made in 1927, in the tubes for a Cottrell precipitator used in phosphoric acid production. Further developments followed speedily as acid absorbers for hydrochloric acid and other small parts of process equipment were produced. In 1936 an entire precipitator was fabricated of carbon. It is still in use. By 1938 engineers had learned to develop impervious forms of structural carbon and graphite, an achievement that opened up another entirely new field for carbon in industry. A large hydrochloric



Carbon can be threaded and machined into intricate shapes.



Horizontal boring mill in operation on carbon cylindrical stock.

acid absorber was constructed entirely of carbon, graphite, or "Karbate" materials, and later an entire processing unit was made for the manufacture and recovery of hydrochloric acid. Since that time even bigger projects have been undertaken. In 1940 carbon parts weighing as much as 4,200 lbs. each were used in the constructon of Cottrell precipitators. Today individual carbon structural pieces are available in weights from ½ gram to 4 tons.

Properties of Carbon

Carbon itself is an extremely inert substance—in fact, one of the most inert substances known. It also possesses many unique physical and thermal properties. Carbon structures have excellent mechanical strength, and the component parts can be machined and fabricated easily and accurately.

Carbon retains its form and mechanical strength up to temperatures as high as 3,500 deg. F. Even above 3,500 deg. F.

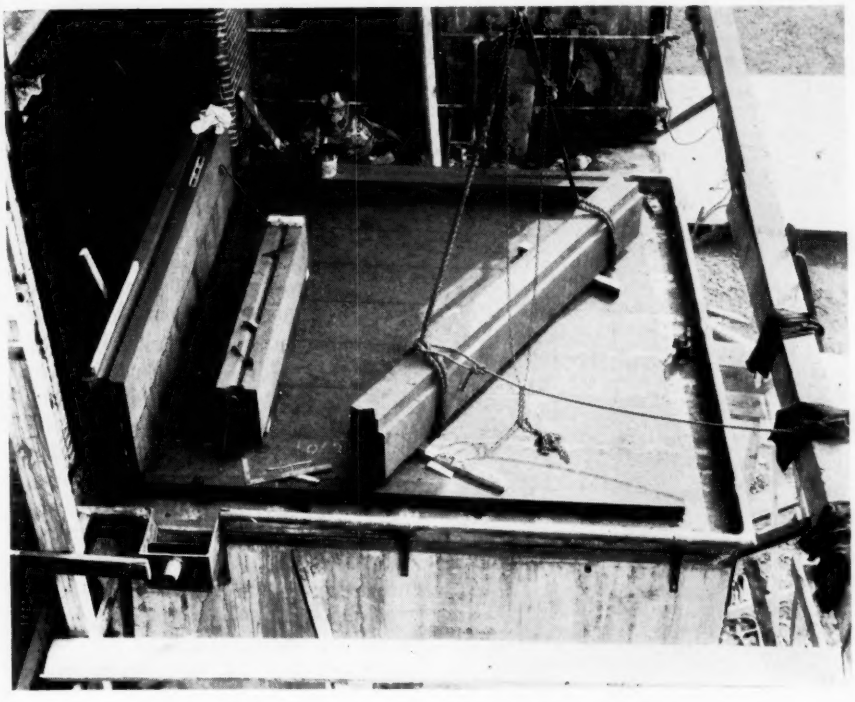
Table I—The Chemical Resistance of Carbon, Graphite and "Karbate"

Resistant to These Reagents	Con. Per cent	Temp. Deg. C.
Acetic acid	Glacial	B. Pt.
Acetic anhydride	100	B. Pt.
Acetone	100	B. Pt.
Air	....	175
Air	....	200
Ammonia	20	Room
Ammonium persulfate	25	
and Sulfuric acid	20	140
Ammonium thiocyanate	25	95
Amyl alcohol	100	B. Pt.
Aniline	100	110
Arsenic acid	75	125
Benzene	100	B. Pt.
Boric acid	25	B. Pt.
Bromine water	Sat'd.	65
Butyl alcohol	100	B. Pt.
Butyl cellosolve	100	110
Butyl cellosolve	25	110
Camphor	.08	50
Camphor	.08	
and Sodium hydroxide	3	50
Carbon dioxide—water	Sat'd.	to 100
Carbon monoxide—water	Sat'd.	to 100
Carbon tetrachloride	100	B. Pt.
Cellosolve	100	110
Cellosolve	25	110
Chlorethylbenzene	Tech.	125
Chlorine, dry	Gas	Room
Chlorine water	Sat'd.	Room
Chloroform	100	B. Pt.
Citric acid	25	B. Pt.
Cupric chloride	10	95
Dioxan	100	B. Pt.
Ethyl alcohol	95	B. Pt.
Ethyl mercaptan—water	Sat'd.	to 100
Ethylene dichloride	100	B. Pt.
Ferric chloride	15	to 60
Ferric chloride	to 60	B. Pt.
Ferric sulfate	25	B. Pt.
Ferrous chloride	40	B. Pt.
Ferrous sulfate	25	B. Pt.
Formic acid	90	B. Pt.
Formic acid	3	
and Potassium dichromate	1	70
Freon-11 ($CFCL_3$)	100	Room
Freon-12 (CF_2Cl_2)	100	Room
Gasoline	100	B. Pt.
Glycerine	100	135
Hydrazine hydrate	85	125
Hydrobromic acid	40	B. Pt.
Hydrochloric acid	20	B. Pt.
Hydrofluoric acid	15	B. Pt.
Hydrofluoric acid	55	66
Hydrofluoric acid	to 90	Room
Hydrogen peroxide	8	
and Mercuric nitrate	10	Room
and Nitric acid	5	
Hydrogen sulfide — water	Sat'd.	to 100
Iodine	100	120
Isopropyl acetate	100	B. Pt.
Isopropyl alcohol	100	B. Pt.
Isopropyl ether	100	B. Pt.
Kerosene	100	to 160
Lactic acid	25	B. Pt.
Manganous sulfate	15	95
Mannitol	25	B. Pt.
Methyl alcohol	100	B. Pt.
Methyl isobutyl ketone	100	B. Pt.
Monochlorbenzene	100	B. Pt.
Monoethanolamine	10	96
Nickel chloride $6H_2O$	300 g./l.	
and Boric acid	30 g./l.	to 75
Nickel sulfate $6H_2O$	318 g./l.	
and Nickel chloride $6H_2O$	16.5 g./l.	
and Boric acid	30 g./l.	75
Nitric acid	2	Room
Nitric acid	10	to 85
Nitrobenzene	100	135
Octyl alcohol	Tech.	B. Pt.
Oleic acid	100	135
Oxalic acid	25	135
Oxalic acid	Sat'd.	
and Nitric acid	0.3	Room
Paraldehyde	100	110
Paraldehyde—water	Sat'd.	110
Paradichlorbenzene	100	125
Petroleum oil	100	160
Phenol	100	110
Phenol	25	110
Phosphoric acid	to 85	to 185
Potassium permanganate	3	
and Sulfuric acid	10	Room
Rayon Solutions		
Na_2SO_4	12-20	60
H_2SO_4	8-12	....
$MgSO_4$	4-6	....
$ZnSO_4$	1	....
Sodium chloride	25	B. Pt.
Sodium dichromate	5	
and Sulfuric acid	10	Room
Sodium hydroxide	to 80	to 135
Sodium hydroxide	3	50
and Camphor	.08	
Sodium hydrosulfite	3	Room
Sodium hydrosulfite	3	
and Hydrochloric acid	0.1	Room
Sodium hydrosulfite	3	
and Sodium hydroxide	0.1	Room
Sodium hypochlorite	5	Room
Sodium nitrate	Sat'd.	
and Sodium carbonate	5	110
Sodium nitrate	25	
and Sodium carbonate	5	110
Sodium sulfate	30	
and Sulfuric acid	15	121
Stannic chloride	15	B. Pt.
Stearic acid	100	135
Sulfuric acid	to 96	to 150
Sulfuric acid	96	
and Chlorine	Sat'd.	
and Hydrogen chloride	Sat'd.	45
Sulfurous acid	7	Room
Tartaric acid	25	B. Pt.
Tetramine C	10	96
Water	100	to 100
Zinc chloride	53	120
Zinc chloride	65	
and Hydrochloric acid	3	90

carbon still does not melt; it sublimes. Throughout the wide temperature range of its solid phase, its coefficient of expansion is practically negligible—0.0000013 per deg. F.—a property that gives carbon a distinct advantage over many structural materials.

Carbon has still another property that has been extensively utilized—a low rate of heat transfer. On the other hand, graphite, another form of carbon, has high heat transfer properties and in the impervious forms is becoming widely used for this purpose.

Carbon also shows a remarkable ability to withstand sudden drastic changes in temperature without cracking or spalling. A carbon brick heated to 1800 deg. C. and then plunged immediately into ice water will remain unaffected; its size, shape, and mechanical strength are unchanged. Likewise, tests were made to determine the resistance of carbon to repeated sudden changes in temperature. For example, carbon rings which are heated rapidly in an induction furnace to about 1,800 deg. C., then cooled in cold water, and finally reheated immediately to 1,800 deg. C., all within less than a minute, are completely unaffected by this unusual treatment and show no signs of deformation or spalling.



An acid tower under construction with floor already completed and walls being built with large one-piece beams.

Table II—Comparative Physical Properties of Carbon, Graphite and "Karbate"

Form of Product	Density: Apparent	Density: Lb. per Cu. Ft.	Porosity %	Strength—Lb. per Sq. In.: Tensile	Strength—Lb. per Sq. In.: Compressive	Strength—Lb. per Sq. In.: Transverse	Longitudinal Modulus of Elasticity x10⁻⁵ Lb./Sq. Ft.	Specific Resistance Ohms/In.³	Linear Thermal Conductivity BTU/Hr./Sq. Ft. °F/Ft.*	Coef. of Therm. Exp. † a
"National" Carbon ½"-2⅜" I.D., incl.	1.51	94.2	24.3	885	10,200	2,700	21.0	0.0014	3.0	15
3"-6" I.D., incl.	1.49	93.0	26.2	980	7,000	2,550	17.0	0.0016	3.0	21
"National" Graphite ½"-2⅜" I.D., incl.	1.68	104.8	24.3	780	5,000	2,820	14.0	0.0003	94.0	12
3"-6" I.D., incl.	1.67	104.2	24.8	870	4,500	2,980	13.0	0.0003	84.0	12
"Karbate" 10 Series ½"-2⅜" I.D., incl.	1.77	110.4	....	1,700	10,500	4,170	29.0	0.00164	3.0	27
3"-6" I.D., incl.	1.76	109.9	....	2,000	10,500	4,640	26.0	0.0016	2.8	33
"Karbate" 20 Series ½"-2 " I.D., incl.	1.86	116.1	....	2,600	11,000	4,650	23.0	0.00034	85.0	23
3-6" I.D., incl.	1.91	119.2	....	2,350	9,000	4,980	21.0	0.00033	75.0	24

* To convert to gram-cal./sec./cm$_2$/°C/cm, multiply by 0.004134.
† Coefficient of Thermal Expansion per °F to temperature t(°F.) = $(a + .0039\ t) \times 10^{-7}$.
Coefficient of Thermal Expansion per °C. to temperature t (°C.) = $(1.8a + .007\ t) \times 10^{-7}$.

Corrosion Resistance

The property of carbon that has attracted the attention of process engineers more than any other is its resistance to most acids, alkalies, and other corrosive solvents or reducing agents. Other than in a few isolated instances, as indicated in Table I, carbon is completely inert. For example, carbon rings subjected for months to continuous showers of concentrated sulfuric or hydrochloric acids at 110 deg. C., show no signs of change.

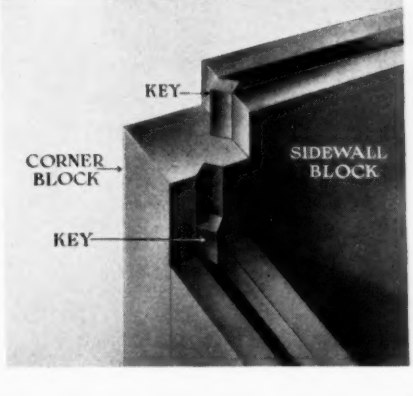
The property of corrosion resistance is used to particular advantage in reaction and scrubbing towers, rectifying towers, in extraction systems and also in other processes where bubble caps, Raschig rings and such pieces of carbon equipment are useful. In the petroleum industry sour gases are sweetened in carbon Raschig-ring-packed columns.

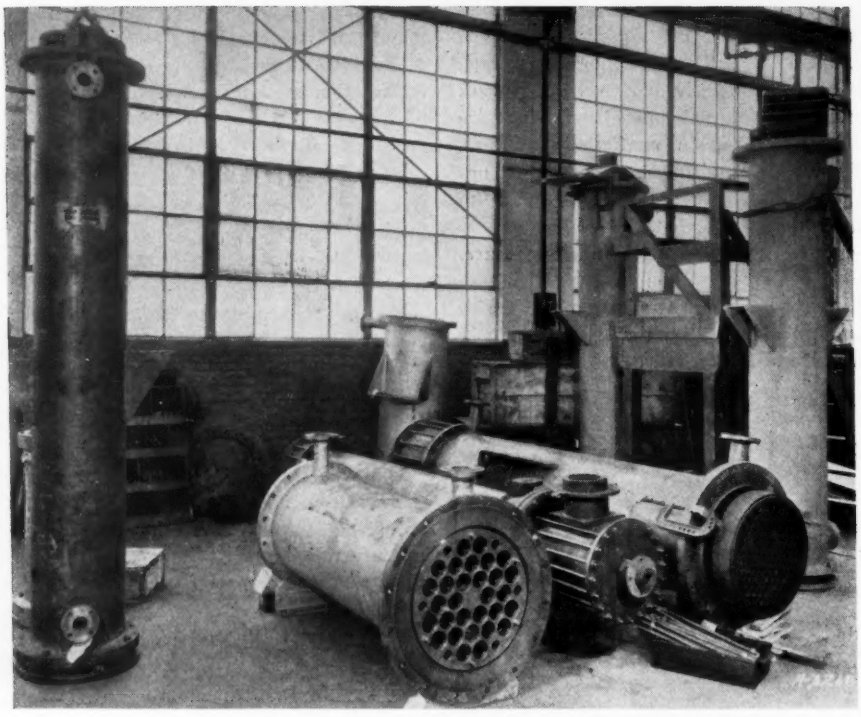
Storage of some liquids and gases for long periods has always presented a great maintenance problem when there is present the possibility of product contamination, as well as corrosion of the container. Fortunately these difficulties are overcome by the use of carbon structural material; and enormous tanks, vats, and towers have been lined with or built entirely from carbon products. This has included all parts of the tanks or towers: floor, side walls, retainers, tube supports, roof beams, roof slabs, vapor outlets, and plenum chambers.

Problems in handling hydrochloric acid are increasing and can be expected to be even greater, since thousands of gallons are obtained each year by various gas absorption methods The use of carbon materials in the disposition of hydrochloric acid makes the picture much brighter because carbon withstands hydrochloric acid at any temperature and at any concentration.

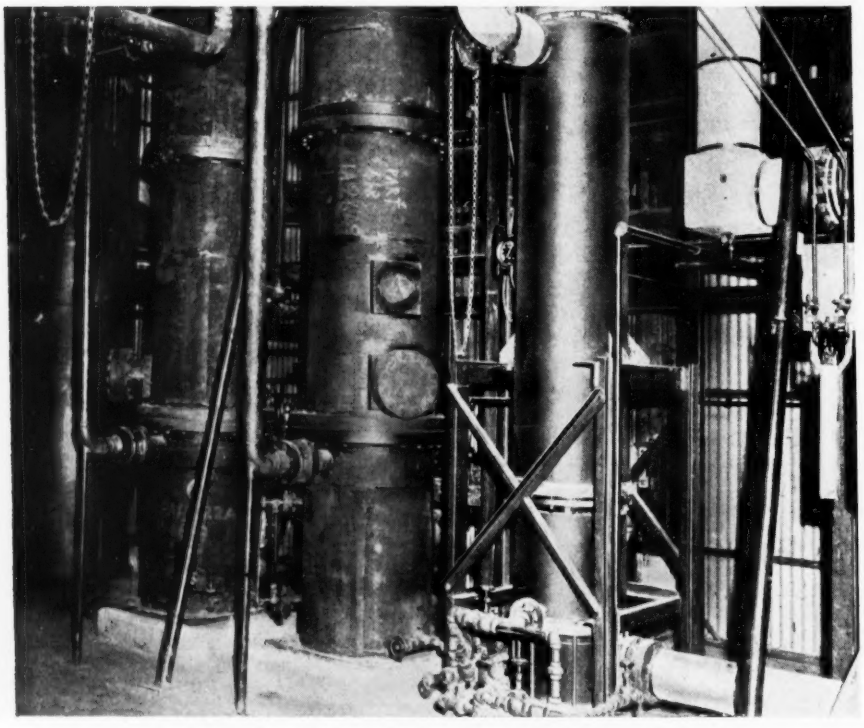
The same thing is true in caustic soda-recovery units, where the soda is cir-

Large carbon beams are joined together by means of "keys" of the same material.





Heat exchangers in different stages of assemblage. The "Karbate" tubes and tube sheets are visible in the two heat exchangers on the right.



Three absorbers and one tube bundle heat exchanger constructed of all "Karbate." The absorbers are packed with carbon Raschig rings.

culated and recirculated. The use of carbon materials extends the useful life of the units many times.

During World War I and until a few years ago, acid recovery units in T.N.T. plants were built with the best available materials. Yet replacement or rebuilding of these recovery systems was necessary after a comparatively short time. Carbon was introduced during World War II for acid recovery systems with the result that processes are subject to fewer interruptions and there is less necessity of shutdowns for repair and replacement.

Graphitizing Changes Properties

Graphite is formed when carbon is subjected to heat under carefully controlled conditions in the electric graphitizing furnace. The change of the carbon structure from an amorphous form to the crystalline structure of graphite naturally results in a change of some of the physical characteristics (see Table II). Graphite is a softer and more unctuous material. It retains all of the corrosion-resistance of ordinary carbon, being unaffected even by bromine at certain concentrations. Graphite can, however, be used under more severe oxidizing conditions than carbon. The electrical conductivity of graphite is 4 to 6 times that of carbon.

Graphite also resists severe thermal shock and remains strong at high temperatures. It differs from carbon, however, more in its rate of heat transfer than in any other property. As is indicated in Table III, carbon has a low rate of heat transfer; graphite, on the other hand, has an extremely high rate of heat transfer, about 25 times that of the carbon from which it is converted.

Because graphite is also an unctuous material it has a very low coefficient of friction—the property that has led to its wide use as a lubricant and as a constituent of lubricants. In many high-temperature applications where oil or greases cannot be used, graphite piston rings and seal rings fill the need because of their self-lubricating properties. Where high pressures or high temperatures are encountered, powdered graphite is used as a filler for greases and other lubricants because they have an affinity for each other.

Impervious Carbon and Graphite

Ordinary carbon and graphite structural forms are slightly porous and permit some seepage of liquids and gases under pressure. To overcome this, an impervious form was developed by impregnating carbon or graphite with various materials. The impervious forms are known by the trade-mark, "Karbate." Since both impervious carbon and graphite are now available commercially, a better selection of the carbon material can be made, depending on the materials to be handled and the treatment involved. The fundamental properties of the impervious materials are essentially the same as the properties of untreated carbon and graphite.

Besides possessing the advantages of carbon and graphite, such as good electrical conductivity, light weight, good mechanical strength, and adaptability to forming or machining in a great variety of shapes, "Karbate" impervious structural products register no porosity at recommended temperatures and pressures. In certain forms their tensile strengths average about 2,500 lb. per sq. in. in

Table III—Heat Conductivity of Various Materials

Material	B.t.u./Sq. Ft./° F./Hr./Ft.	
Copper	224	† 32° F.
Aluminum	75–131	o (Room Temp.)
Brass (Red)	93	o (Room Temp.)
"Karbate" No. 21, 22 and 28 (graphite base)	75	200° F.
Admiralty	65	o (Room Temp.)
Tantalum	32	o (Room Temp.)
Hi Silicon Cast Iron	31	o (Room Temp.)
Steel, 1% Carbon	26	* 64° F.
Chemical Lead	20	o 32-212° F.
Antimony Lead	17–20	o 32-212° F.
18-8	7.3–17.0	o 32-212° F.
Nickel Chromium (17% Ni, 13% Cr)	8.5	o (Room Temp.)
"Karbate" No. 11, 12 and 18 (carbon base)	3	100° F.
Boro Silicate Glass	.63	* 86-167° F.
Chemical Stoneware	.83	
Fire Clay Brirk	.6–.74	* 932° F

† International Critical Tables.
* "Heat Transmission"—(McAdams, 1933). p. 314.
o Chemical & Metallurgical Engineering, Nov. 1938.

comparison with an average tensile strength of 850 lb. per sq. in. for carbon and graphite.

An interesting feature of the impervious products is the maximum safe temperature to which they can be raised. As has been pointed out, non-impervious types of carbon and graphite can be heated to high temperatures without injury. The critical temperatures of impervious carbon and graphite are comparatively lower. The low critical temperature of this form of carbon is due to the fact that the impregnant decomposes at higher temperatures. Impervious forms can be used efficiently if the "body" temperatures do not exceed 170 deg. C. A face of an impervious carbon structure, as an example, can be raised much higher than 170 deg. C. if sufficient cooling is provided to limit the interior or body temperature of the brick to the safe range.

The first impervious-carbon heat exchanger was installed eight years ago. This exchanger has been continually exposed to hydrochloric acid at varying temperatures for that period; it is still working regularly and shows no signs of deterioration. The factors normally destructive to the usual type of heat exchangers simply do not attack the impervious carbon or graphite.

In addition to corrosion resistance and high heat-transfer properties, heat exchangers of either the impervious or regular carbon and graphite possess satisfactory strength. Such equipment can withstand pressures as high as 100 lb. per sq. in.

Uniform Porosity Now Possible

While impervious forms of carbon and graphite find many uses in chemical and process industries, highly porous forms are frequently preferable. Such forms can now be made by sizing and bonding carbon or graphite particles to form rigid, uniformly porous masses in which the pores are interconnected in all directions. The porous materials of carbon and graphite can be made exactly to the desired size and shape.

As shown in Table IV, the porous forms in addition have essentially the same physical properties as ordinary carbon and graphite. Their chemical resistance, naturally, is exactly the same. Classification of the porous materials is made according to their permeability expressed in the quality of water or air that passes through a unit area of the material of unit thickness at a given pressure and a given length of time. Ideal porous materials combine high permeability and small pore size.

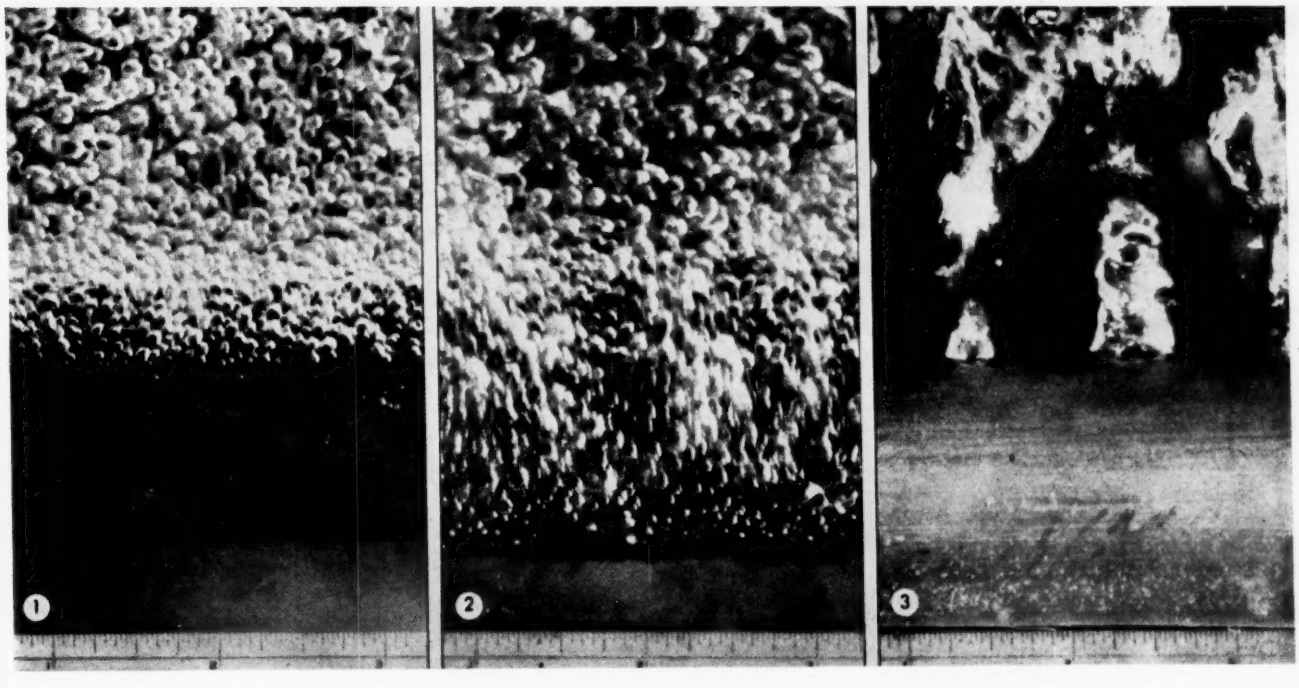
The two primary uses of porous forms are purely mechanical applications—gas

Table IV—Average Physical Properties of Porous Carbon and Graphite

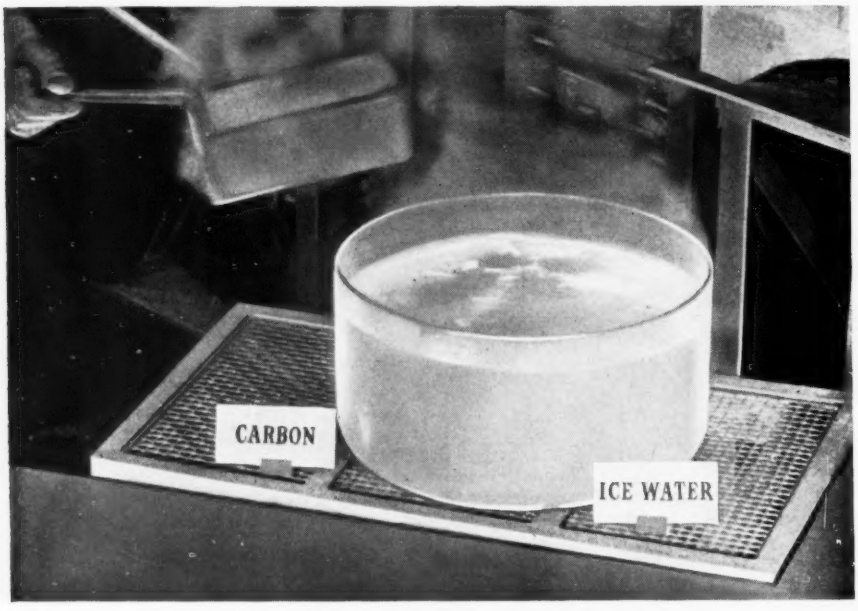
Grade	Material	Weight Lbs./ Cu. Ft.	Effective Porosity Per Cent	K*	Electrical Resistivity Ohm Inches	Minimum Strength: Tensile Lbs./ Sq. In.	Transverse Lbs./ Sq. In.	Compressive Lbs./ Sq. In.	Average Pore Diameter: Inches	Microns	Filter Action Minimum Diameter Particle Retained (Inches)
60	Carbon	69	48	27	0.0070	190	600	850	0.0013	33	0.00047
60	Graphite	69	48	21	0.0012	110	250	500	0.0013	33	0.00047
50	Carbon	69	48	27	0.0070	180	500	830	0.0019	48	0.00079
50	Graphite	69	48	21	0.0012	110	250	500	0.0019	48	0.00079
40	Carbon	69	48	27	0.0057	120	320	900	0.0027	69	0.00098
40	Graphite	69	48	21	0.0013	100	190	500	0.0027	69	0.00098
30	Carbon	69	48	27	0.0070	100	250	770	0.0039	99	0.00173
30	Graphite	69	48	21	0.0017	80	200	520	0.0039	99	0.00173
20	Carbon	68	48	27	0.0070	90	240	700	0.0055	140	0.0030
20	Graphite	68	48	21	0.0020	60	140	310	0.0055	140	0.0030
10	Carbon	68	48	26	0.0080	80	160	300	0.0075	190	0.0059
10	Graphite	68	48	21	0.0020	50	140	270	0.0075	190	0.0059

* Coefficient of Thermal Expansion /° F. to temperature $t(° F.) = [K + .0039\, t(° F.)] \times 10^{-7}$.
* Coefficient of Thermal Expansion /° C. to temperature $t(°C.) = [1.8K + .007\, t(° C.)] \times 10^{-7}$.

High speed photographs showing comparative size of air bubbles produced by diffuser elements submerged in water at 70° F. (1) Grade 30, size 3, type A porous carbon diffuser (operating at 13.7" diff. pressure loss). (2) Grade 30, cylindrical porous carbon diffuser 1¾" OD x ¾" ID. (Operating at 13.7" diff. pressure loss). (3) Perforated "Karbate" pipe (1/16" diameter holes on 1" centers).



diffusion and the filtration of corrosive liquids and gases. Filtration is not carried out by the porous material alone but it actually is a joint action between the porous medium and the "cake" or deposited material, for the cake, as it is deposited, also acts as a filter medium. Cake characteristics and other operational conditions determine the grade of porous carbon to be used.



A carbon brick is heated to 1,800° C., immersed in ice water, and removed, demonstrating resistance to thermal shock.

Uses in Dispersion of Gases

Gas dispersion is becoming an increasingly important factor in scientific research, particularly in the carrying out of chemical, physical and biological processes. Porous carbon and graphite forms are particularly effective for gas dispersion because of their high uniform porosity and small pores. Corrosive liquids, such as pickling solutions, can be heated quickly by passing steam through a porous carbon, for the minute bubbles of steam are dispersed and the heat from them is rapidly absorbed as they pass through the liquid.

Carbon and graphite diffusion products have become useful in a number of processes, namely: absorption of gases by liquids; scrubbing of liquids and gases; air-oxidation reaction and the aeration of sewage; and the agitation of electroplating solutions permitting an increase of the current density.

Porous carbon and graphite are available in a variety of forms for filtration and gas dispersion: plates, open and blind-end tubes with flanges, and rods of a number of different sizes. A variety of special shapes can be fabricated to meet unusual needs that might arise.

Demands for entire carbon graphite, and "Karbate" structures have led to the manufacture of numbers of unassembled structures and their parts. Special structures or their parts are fabricated without difficulty.

Since carbon products are made by extrusion or molding and later machined by any of the usual methods—cutting, sawing, turning, threading, planing, and polishing—special shapes are supplied for all sizes and types of equipment.

The fabrication of carbon products has been perfected to such an extent that complex pieces of chemical equipment can be assembled entirely from carbon, graphite, or their impervious forms. Reaction vessels and towers, scrubbing towers, condensers, electrostatic precipitator units, centrifugal pumps, valves, pipes, and fittings, and various types of heat exchangers are made from carbon, graphite or impervious forms.

Heat exchangers that have been fabricated include those of the immersion, bayonet, concentric-tube, continuous, shell-and-tube, and tube-bundle types, as well as gas-flame and electric heating tubes and coils. A tube-bundle type of heat exchanger made from impervious and standard graphite parts will transmit more heat than one made of most materials, as indicated in Table III. Every part in this type—outlets, inlets, domes, tubes, tube sheets, and shells—is made of graphite. The tubes are cemented into the tube sheets with a cement having the same properties, making the exchanger uniformly chemically resistant. Hundreds of such exchangers have been used with complete satisfaction.

Construction engineers, having in mind the nature of this material, have no problem in construction and assembly. The most effective joining has been accomplished by threading, flanging, and occasionally, cementing.

Construction and Assembly

Four types of joints are generally used in carbon pipe and fittings: the cemented tapered joint, the threaded joint, the flange joint, and the "Flexlock"* joint. The cemented tapered joint is the most commonly used; it is low in cost, strong, leakproof, and durable, and can be made at the factory or in the field. The flange joint is also useful in the field, especially where it may be desirable to disconnect at times, for it can easily be disassembled and again refitted. The "Flexlock" joint is a patented connection that can be used in many situations where vibration might cause a rigid joint to fail. Essentially this joint consists of a ribbed collar-shaped rubber gasket to provide the seal between pipe and fittings.

Large carbon structures are assembled by an ingenious method. This method consists of side-wall blocks joined by a corner block. This block is held in place by a tight-fitting key that prevents the corner block from slipping out. Special carbon cements that actually bond with the carbon are used freely at all joints to prevent leaking. With this method of assembly a carbon tower can be built in a few days, whereas the same tower built of other materials might require up to five weeks for construction.

Installation of Acid Precipitator

The setting up of a carbon acid precipitator exemplifies the steps and the necessary care that must be taken in such an operation. All blocks are cleaned before applying the cement. The laying of carbon blocks is somewhat similar to laying ceramic bricks. The cement is applied neatly and extended continuously from the top to the bottom of the blocks. The cement is set by baking, a process that is effected after 48 hours of drying. Baking is carried out at temperatures in excess of the maximum operating temperatures. With some other grades of carbonaceous cements, baking or drying is not necessary.

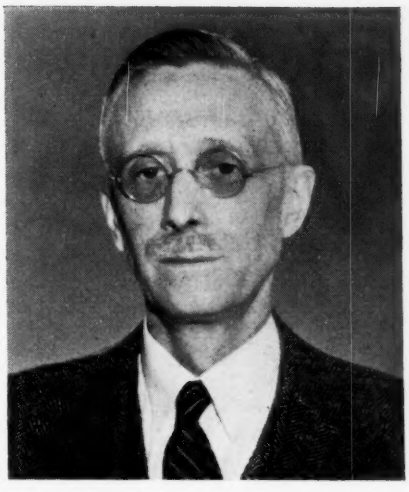
Standard, impervious, and porous carbon and graphite products have made a permanent place for themselves in the chemical industry. Because of the wide availability of the forms of structural carbon, many of the major maintenance problems—caused by corrosion and temperature conditions—have been solved. As their use becomes widespread, it is easily conceivable that still newer and faster methods of fabrication will be achieved at even lower costs than at present.

* "Flexlock" is the registered trade-mark of the Flexlock Corp.

HEADLINERS in the NEWS

FRED H. HAGGERSON, vice-president and director, has been elected president of Union Carbide and Carbon Corp., succeeding Benjamin O'Shea, who now becomes chairman of the board.

DR. HUGH S. TAYLOR, well-known professor of chemistry at Princeton, has been appointed Dean of the Graduate School, effective a year from next July.

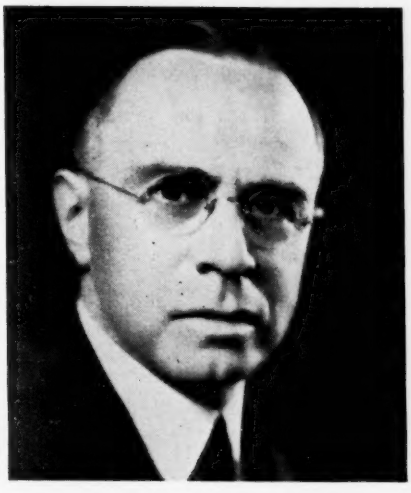


CHARLES RAYMOND DOWNS, consulting chemical engineer, was elected president of the Chemists' Club of New York at its recent annual meeting. He succeeds C. R. DeLong.

W. J. HARSHAW, honorary chairman of the 36th semi-annual meeting of the American Institute of Chemical Engineers, held at Cleveland, Ohio, May 14 to 16.

SIDNEY D. KIRKPATRICK, editor of Chemical & Metallurgical Engineering was elected president of the Electrochemical Society, Inc., at its 85th meeting held recently in Milwaukee.

DR. STUART D. DOUGLAS, head of Plastics Research, Carbide and Carbon Chemicals Corp., has been presented the John Wesley Hyatt gold medal for achievement in the plastics industry.

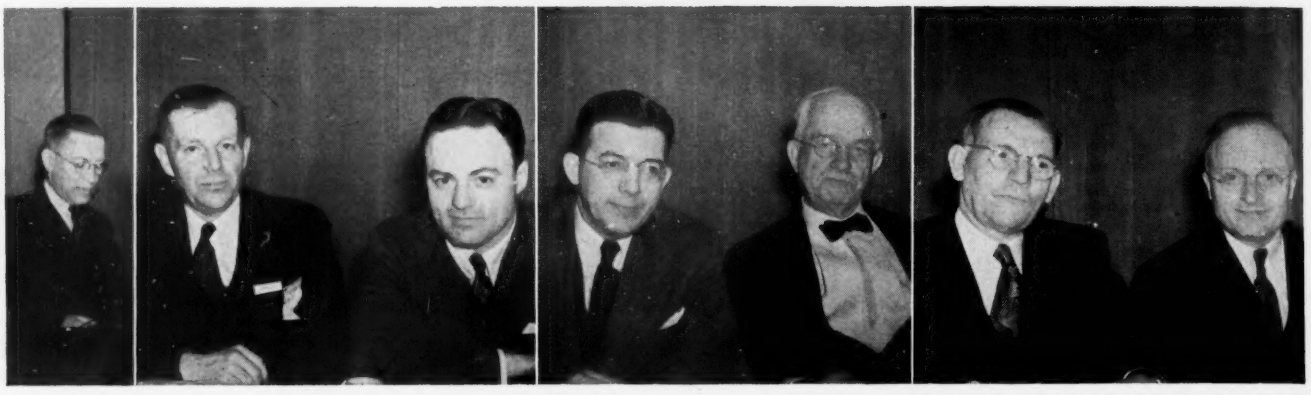


DR. JOHN F. THOMPSON, executive vice-president of International Nickel Co., has been awarded the Egleston Medal by the Columbia Engineering Schools Alumni Association for engineering achievement.

FELIX N. WILLIAMS, production manager of the Phosphate Division of the Monsanto Chemical Co. was recently appointed general manager of the company's Plastics Division at Springfield, Mass.

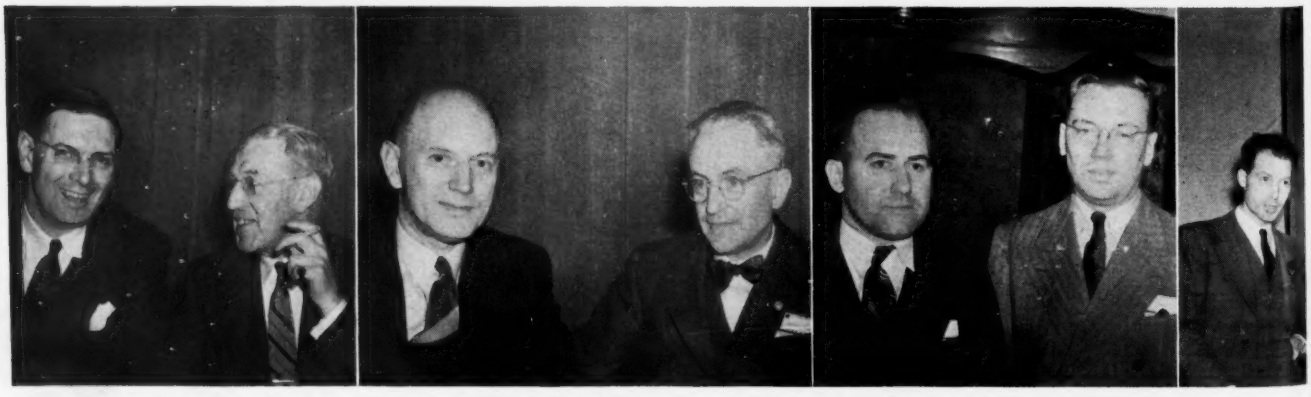
A. C. S. Rubber Division Meets in New York

Rubber technologists gathered in New York on April 26 for the three-day spring meeting of the Division of Rubber Chemistry of the American Chemical Society. The meeting was almost entirely devoted to technical sessions with great emphasis on the research and development of improved synthetic rubbers. At the right is a general view of the opening session. For a more complete report of the meeting see page 723.



Members and guests at the front table of the annual dinner were: Dr. Harold Gray, chairman of the Division; Harry E. Outcault, chairman of the Local Arrangements Committee; E. R. Rowzee, Canadian Synthetic Rubber Corp.; H. I. Cramer, Sharples Chemicals, Inc.; Charles L. Parsons, secretary of the A.C.S.; J. H. Doering, R. T. Vanderbilt Co.; Alden H. Emery, assistant secretary of the A.C.S.

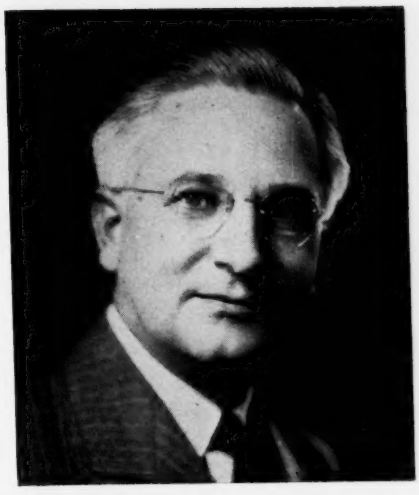
George S. Haslam, New Jersey Zinc Co.; Dr. Vincent du Vigneaud, chairman of the New York Section of the A.C.S.; Walter J. Murphy, editor of Industrial and Engineering Chemistry; Walter J. Vogt, Goodyear Tire & Rubber Co.; E. B. Babcock, Deputy Rubber Director; A. H. Nellen, Office of Rubber Director and Lee Tire & Rubber Co.; Bruce Silver, New Jersey Zinc Co.; C. W. Christensen, Monsanto Chemical Co.; F. S. Conover, Naugatuck Chemical Div. of U. S. Rubber Co.



J. T. Blake, Simplex Wire & Cable Co.; B. J. O'Donnell, British Raw Materials Div.; S. G. Byam, E. I. du Pont de Nemours & Co.; C. C. Davis, Boston Woven Hose & Rubber Co.; W. C. Mast of the Eastern Regional Research Laboratory who presented paper on "Preparation and Properties of Vulcanized Acrylic Resins, Copolymers of Ethyl Acrylate and Allyl Maleate"; C. H. Fisher, also of Eastern Regional Research Laboratory who spoke on "Lactoprene—A New Synthetic Rubber"; and E. A. Hauser of M.I.T. who discussed the electron microscope.

American Institute of Chemists Presents Gold Medal Award to Dow

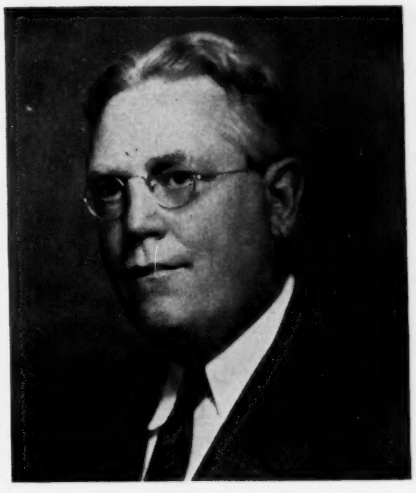
The American Institute of Chemists held its annual meeting on Saturday, May 13, in New York. Most of the day was given over to reports of the various officers and committees, and to talks by the following: Dr. Harry S. Rogers, president of Polytechnic Institute of Brooklyn on "Attributes of a Profession"; Dr. Harvey N. Davis, chairman of the Office of Production Research and Development and president of Stevens Institute on "Victory Through Technology"; Dr. M. L. Crossley, director of research of American Cyanamid Co. on "Defining the Chemist"; and Dr. Raymond E. Kirk, Department of Chemistry of the Polytechnic Institute of Brooklyn on "Employer-Employee Relations."



At the annual dinner Dr. Willard H. Dow, right, president of the Dow Chemical Co., was presented with the Gold Medal Award of the Institute.

Dr. Gustav Egloff, president of the A.I.C. presided at the meeting and presented the award to Dr. Dow.

Dr. Mark E. Putnam, vice-president of the Dow Chemical Co. spoke on "Willard H. Dow—The Man."



Col. Bradley, Rubber Director, War Production Board, addressed the meeting on "Dow and the War Effort."

National Starch Products Inc. Occupies New Laboratories

Photographs show the three main units of the new laboratories of National Starch Products, Inc., at 270 Madison Avenue, New York. At the same location but not shown the company has textile, resin adhesives, and training laboratories as well as small capacity pilot plants for both its adhesives and starch divisions.

The Development Laboratory is shown at the right.

General view of the Technical Service Laboratory

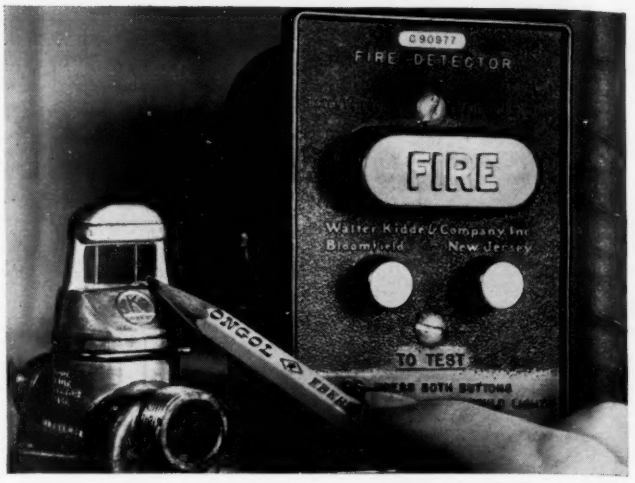
Research laboratory for the study of starch and adhesives problems

Carbon Dioxide Extinguishing System Kills Tank Fire Menace

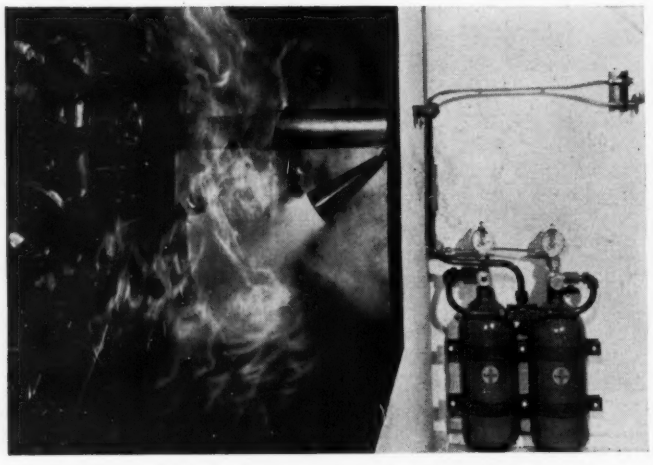
An ingenious new fire-detecting, fire-fighting system so devised that it signals the driver the instant fire breaks out and then extinguishes the flame is now saving U. S. battle tanks from destruction and is relieving the crew of its greatest enemy—fire in the tank itself. The operation of the carbon dioxide fire-fighting system for this purpose opens up the possibilities of its use in protecting various kinds of industrial equipment and apparatus after the war.

The system consists of a detector which relays a red fire signal to the instrument panel of the tank and a manual control lever which, when pulled, instantly floods the engine compartment with a blanket of carbon dioxide gas and smothers the flames. The detector contains two organic filaments, each of which holds open an electric switch. Upon contact with flame, the filaments are destroyed, closing the switch.

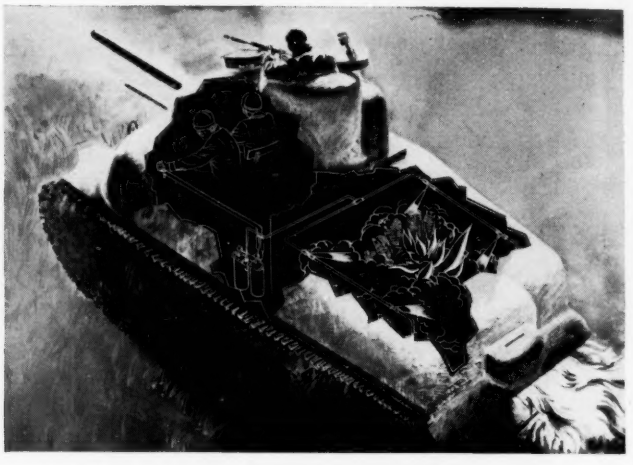
Used for sometime on U. S. warplanes, this system was developed by Walter Kidde & Co. to combat the highly flammable vapors of the high-test fuels used in war machines.



Pencil points to two fine organic filaments which hold open the electric switch. When these filaments are destroyed by fire the circuit is closed and a red fire signal flashes on the driver's instrument panel.



Representation of the carbon-dioxide fire-extinguishing system. A tug of the control handle opens valve in storage cylinder where CO_2 is held in liquid form. The force of expansion drives the gas through the discharge nozzles.



Spouting fire, this tank is safe from fire internally. The driver has pulled the lever which releases carbon dioxide and the burning engine compartment of the tank is being flooded with the fire-killing gas.

Esso Research Club First Industrial Group in Sigma Xi

The first industrial research group to qualify and be granted affiliation with Sigma Xi, national scientific honor organization, is the Esso Research Club, of Elizabeth, N. J., whose membership is drawn from chemists, physicists, engineers and other technical and development personnel of the companies associated with Standard Oil Co. of New Jersey.

Dr. Harlow Shapley, Sigma Xi president, right, hands charter to Dr. Minor C. K. Jones, retiring chairman of Esso Club at installation dinner held at Elizabeth, April 26. Looking on are Wallace E. Pratt, left, vice-president and director Standard Oil Co. and E. W. Carlson, new chairman of Esso Research Club.

PHOSPHORUS . . . Element of a Million Faces

Moviedom's man of a million faces has an able and energetic counterpart in chemistry's phosphorus. This versatile element is constantly being cast in new and engaging roles . . . in phosphorus compounds that have provided Victor chemists with challenging opportunities for research. Typical is the phosphorus compound whose properties are briefly detailed below:

Victor Emulsifier No. 87—A neutral, long-chain alkyl phosphate containing a water-solubilizing group. Specific gravity, 0.975 at 77° C; melting point, 48-50° C. A waxy solid, soluble in warm water, giving thickened solutions. Forms creamy emulsions of the oil-in-water type. Suggested uses—emulsifier, oil additive, thickener.

A catalog of Victor chemicals in commercial production is available upon request.

Victor

CHEMICAL WORKS

HEADQUARTERS FOR PHOSPHATES • FORMATES • OXALATES

141 W. Jackson Blvd., Chicago, Ill.; New York, N. Y.; Kansas City, Mo.; St. Louis, Mo.; Nashville, Tenn.; Greensboro, N. C. Plants: Nashville, Tenn.; Mt. Pleasant, Tenn.; Chicago Heights, Ill.

BETWEEN THE LINES

Government Postwar Planning

Although it is being soft-pedalled, a number of government agencies and departments are going forward with their own post-war planning to varying degrees and in varying stages of development. The most advanced are those having to do with foreign relations and trade. The next step anticipated is determination of what agencies will have a part in post-war "reconstruction."

WHILE THE very term "post-war" is anathema in some quarters of the Federal Governmental set-up, the agencies most concerned are devoting far more attention than is generally realized to post-war trade affairs. Much of this attention centers on matters of primary interest in the chemical field. Not all of it is entirely free of disturbing connotations for the industry, but there are also encouraging features of the activity.

The keynote of this departmental attitude was perhaps sounded by Secretary of State Hull, who told former colleagues in Congress recently that "The Department of State is alive to its responsibilities. It is alive to its responsibilities of the war and alive to its even heavier responsibilities of the peace to follow."

Due to the state of the world a great deal of departmental activity, both of the State and other Federal agencies, is somewhat academic in tone, "research" being used generally in speaking of it. For the past year much of this "research" has been financed by allocation of funds from the President's emergency budget, but the State Department, as well as others, is now coming to Congress for appropriations for the coming year, so that a better picture of the trend of thought is now available than heretofore.

The Cartel Question

On one of the important phases of this work no official pronouncement has been forthcoming. This deals with the preoccupation of the State Department as well as allied agency staffs, with the so-called cartel system. It is known that the State Department has established a section in its Office of Foreign Economic Affairs to give special attention to all phases of the subject, and even that some informal approaches have been made to representatives of other governments on the matter. The consensus is that the department is seeking to develop some form of international working arrangement for government of cartel arrangements in the postwar period, although of course, elements in Washington are seeking their abolition, in theory at least.

Between this extreme attitude and others more conservative, there is believed to be some recognition of the problems of those larger American industrial organizations engaged in world competition which must work alongside, if not with, foreign industries which not only can operate in cartels, but frequently with the government of their home country as a silent partner.

There is reported to be a movement to bring about revision of the Webb Act, so that American concerns would be able to function in comparative freedom from the restraints of domestic anti-trust statutes when engaged in business overseas. However, such latitude abroad would be compensated, so far as the public at home is involved, by the pending legislation to compel full publicity on all cartel agreements in which Americans are a party.

Just how this would work, with foreign cartels under no such compunction, is at present merely speculative. This is not the law as yet, but the bill to this effect is a part of the many sided legislative attack on cartels, now under way. It rather points up the informed explanation that all foreign trade from this country at least, for an indefinite period after the war, will be subject to a degree of regulation never foreseen in earlier years.

One has only to recall the public interest in our projected oil policy in the Near East to realize that not again for a decade perhaps, will international ventures of American interests, even those which may be backed by government support, be the private affairs of other days.

Regarding the more tangible aspects of American foreign trade, post-war and present, these are more or less confined to Latin America. European zones are in the war area, so are those across the Pacific. Goods in traffic over both oceans are largely covered by war labels. The departmental approach to the Latin American trade, like that of the State Department to cartels, also has some peculiar industrial angles.

Industrialization of Latin America

Large amounts—some estimates place the figure at $2,000,000,000—have been made available as credits, under various U. S. agency operations, for "development" work in Latin American countries. In some rather important instances, it is known, this word actually means that industrialization is being pushed. When this implication first became known around Congressional committee rooms, an obvious question was raised as to the logic of using American public money, the intake by the Treasury from taxes on American corporations included, to promote industrial projects in customer countries for our own manufactures in other times. Were we simply helping these former customers to become independent of us in a post-war world of very uncertain trade prospects, at best?

The view of one such official will be summarized here, and, it can be added, this writer found almost identical ideas being voiced by an entirely different top official in the same bureau of the Department of Commerce.

Regardless of the figure of such advances, he said in substance, any amount spent for industrialization in South America would, in the long run, be beneficial to private industry in the United States. In fact, said this official, "We look with some favor on the industrialization of Latin America. It is an inevitable step in the economic advancement of a country."

Even if this development took the turn that it resulted in producing some of the same things the United States is manufacturing, it would make no difference in the long run, this official held. It merely means a change in the kind of goods American manufacturers would be selling in those countries, he added.

By implication these two officials conveyed the thought that an industry in a Latin American country would mean that such country, instead of procuring from us, for illustration, certain finished chemical products, would be in the market for the machinery to process its own, but it would also need from this country, say, certain chemical raw materials we might not now be selling there.

There is yet another phase of competition under war conditions that is worth noting in passing. Perhaps it is not as flagrant currently, but the situation led to widespread complaints in the recent past. This concerns those American firms who are cooperating with their government's restrictions and are holding

(*Turn to page 731*)

CITRIC ACID AS AN AID IN SAVING HUMAN LIVES

The dramatic story of the lives saved among our battle casualties by means of blood plasma is too well known to need repeating. It may not be, however, a matter of common knowledge that Sodium Citrate, produced from Citric Acid, is used in preparing every pint of this life-saving plasma.

Those who have donated their blood to the Red Cross (which we hope includes or will include all who read this) may have noticed that the flask, into which the vital fluid was drained, contained a small amount of a clear liquid. This was a solution of Sodium Citrate which had been carefully filtered and sterilized to insure absolute freedom from any foreign organisms.

Ordinarily this donated blood would clot in a short time, rendering it useless for plasma production. The Sodium Citrate, however, prevents this clotting and permits the separation, even after many hours of storage, of the white and red corpuscles which comprises the first step in the preparation of plasma.

Even with millions of pints of plasma being produced, the consumption of Sodium Citrate is small compared with that of other uses to which this salt is put, but there is no question that this is its most important field of usefulness.

We are the leading producers of Sodium Citrate, both U.S.P. XII containing two, and VIII containing five and one-half molecules of water of crystallization. Both salts are of equal purity and must meet our own rigid specifications, as well as those of the U. S. Pharmacopoeia.

Chas. Pfizer & Co., Inc., 81 Maiden Lane, New York 7, N. Y. or 444 W. Grand Ave., Chicago, Ill.

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NEW PRODUCTS & PROCESSES

Mathieson Alkali Enters Synthetic Rubber Field with Heat Resistant Butadiene Base Product

A new type of synthetic rubber, unique because it promises to be especially suitable for use in making heavy-duty tires for trucks, buses and even military vehicles, has been developed by the Research Department of The Mathieson Alkali Works, it was revealed recently by G. W. Dolan, president of the company.

"The new rubber is strong, tough and resistant to cuts and abrasion," said Mr. Dolan. "But its outstanding characteristic is that, unlike GR-S, formerly known as Buna-S, which constitutes most of the rubber thus far produced in this country, the Mathieson rubber withstands elevated temperatures."

Tires subjected to heavy loads and high speeds become excessively heated in service and wear rapidly if made from rubber that weakens at high temperatures. Preliminary reports of comparative road tests under the sponsorship of the Office of Rubber Director indicate that the Mathieson rubber stands up well under severe service conditions, according to Mr. Dolan.

Reports of independent laboratory tests show that the Mathieson rubber has greater resistance to heat, moisture, oil and kerosene than GR-S, and less permeability to gases. In certain of these respects, the laboratory tests indicate superiority to natural rubber as well. "We are told also," Mr. Dolan stated, "that our rubber has good milling properties."

"The Mathieson rubber is made of butadiene and a new chemical produced from readily available raw materials," said Mr. Dolan. "Its cost is expected to be about the same as that for GR-S on the same scale of manufacture.

"Our rubber is still in the development stage and, of course, plans for its production cannot be revealed," he concluded.

G. W. Dolan, President of Mathieson Alkali Works, displays new synthetic rubber developed by the company.

New Furane Resin

The U. S. Stoneware Company has announced the current availability for limited commercial and experimental use of a new basic resin having widespread immediate applications.

The new resin, named Duralon, a furane derivative, is claimed to be characterized by the lowest water absorption of any organic resin, insolubility (after activation) in any solvent or combination of solvents, high electrical resistivity, absolute stability in storage and handling, and by ease of workability.

Duralon resin, in its pure form, is a heavy, viscous liquid, dark maroon in color. On incorporation of catalysts and application of mild heat Duralon reverts to an extremely hard, dense, black substance. Varying physical, chemical and electrical properties can be developed in the base resin by incorporation of the usual fillers and lubricants. In certain stages Duralon can be readily machined by drilling, milling, turning, sanding, grinding, etc.

Duralon resins are readily soluble, before activation, in many hydrocarbons, as well as in ketones and chlorinated solvents.

While preliminary studies indicate that Duralon possesses definite molding possibilities, its paramount immediate importance is as an impregnant, as a laminating and bonding agent, or as a protective coating material. It is in these applications that its resistance to moisture, its insolubility in solvents (even at elevated temperatures), its versatile surface characteristics (ranging from a high gloss to a crinkle finish), prove highly essential in solving many present-day problems. Many of these properties can be attributed to the unusual wettability of the unconverted resin.

Duralon solutions may be applied as coatings by any of the conventional processes, or may be used for impregnation of porous materials such as stone, cement, plywood, asbestos, glass fibres, or other fibrous materials, or as a bonding agent for abrasive compounds, powdered metals, etc., or for adhesive bonding of fibrous materials to each other.

Prior to the application of heat, Duralon coatings are soft and flexible. As heat is applied (a mild bake is usually sufficient) the coatings remain thermoplastic up to a point, at which time they become increasingly thermosetting, depending upon the type and extent of activation. Other Duralon resins, shortly to be made available, are completely non-thermoset-

ting and have interesting plasticizing, wetting and tackifying properties over wide temperature ranges.

No particular surface preparation is needed before application of Duralon coatings, nor is a prime coat necessarily required.

Duralon coatings, after baking, are hard and while somewhat more brittle than coatings of the thermoplastic type, are said to show excellent abrasion resistance and aging characteristics. The water and solvent resistance of the pure Duralon resin is fully imparted to coatings made from the resin. Such coatings show practically zero water absorption, are unaffected by any solvent, possess excellent resistance to all non-oxidizing acids, and good resistance to alkaline materials. Products made from Duralon resins are claimed to not only show a permanence of properties at normal temperatures, but apparently retain a preponderance of their desirable properties at temperatures in excess of 400° F.

New Resin for Use in Paint Field

A new maleic type resin, designed for use with interior architectural enamels, fast baking metal decorating enamels, printing ink vehicles, clear overprint varnishes and short oil varnishes for blending with alkyds, has been announced by the Resinous Products & Chemical Company of Philadelphia. Known as Amberol 808, this synthetic resin can be used with all the common varnish oils, including linseed, dehydrated, castor, oiticica, fish and tung and imparts excellent through hardness and gloss retention, better solubility in bodied varnish oils—increased ease in handling and reduced cooking time—greater petroleum tolerance, faster surface dry and harder through dry overnight, and better alkali resistance and drier retention.

Although Amberol 808 is designed primarily for use in the manufacture of pale oleoresinous varnishes and white enamels, it can be used effectively with all types of varnish oils and proves especially useful in vehicles containing all or preponderant amounts of the soft oils. It is also proving outstanding for use in a variety of finishes of both the air-drying and baking types. Because of its high viscosity and good drying properties, a wide latitude is permissible in the choice of oil length for particular applications.

Its high viscosity is combined with good solubility in bodied oils and good petroleum tolerance. According to the company it is well suited to the simplified cooking procedures that are now standard in the industry, and its varnishes are characterized by pale color, good color retention, good drying properties and adequate resistance to water and alkali.

A unique feature of this resin is said to be its ease of kettling. All the oil, after heat bodying to relatively high viscosity may be heated with the resin. Amberol 808 has excellent solubility and is readily dispersed in the oil, thus eliminating the necessity for dispersing the resin in a limited quantity of the oil and then adding the balance of the oil after dispersion is thoroughly effected.

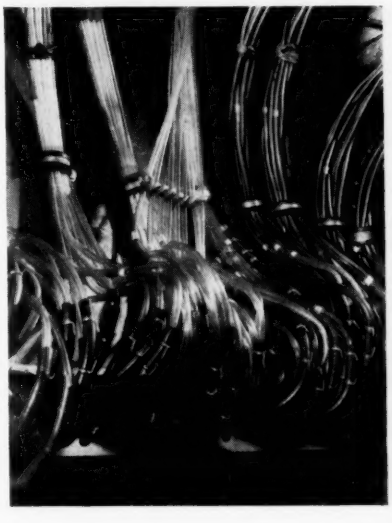
Uses for Vinyl Resin Tubing

Solvent-proof rubber-like and transparent tubing made of compar, a special type of vinyl resin developed by Resistoflex Corporation, is finding a number of new uses in industry.

In laboratory use its transparency permits inspection of the contents. Because the tubing is tough, strong, and completely inert to almost all organic solvents it is useful for low pressure, room temperature handling of many materials. It is not affected by such active solvents as carbon disulfide, carbon tetrachloride, trichlorethylene, perchlorethylene, acetylene tetrachloride, benzol and toluol or by oils and fuels.

Having low permeability to gases of all natural and synthetic rubber-like materials and being unaffected by such gases as freon, methylchloride, methyl bromide, phosgene, mustard, propane, butane and water gas, further applications are immediately apparent. When used on Bunsen burners or other laboratory appliances the tubing does not absorb the protective odors with which illuminating gases are usually loaded and, therefore, prevents the laboratory atmosphere from being contaminated by them.

Transparent compar tubes filled with mercury are used by aircraft manufacturers to observe and to record by motion picture the behavior of flight instruments during test flights.



One of the many interesting applications which has been developed recently in the aircraft industry is as temporary instrument lines for test flights. Filled with mercury, its transparency permits taking moving picture records of the field movements during test flights thereby making possible an accurate check of the flight instruments. Another appplication for which the translucent tubing has proven well adapted is as a cover for the conveyor hooks passing through degreasing operations.

t-Butyl Hydroperoxide

The Union Bay State Chemical Company has announced the availability of commercial t-butyl hydroperoxide. The new product is suggested by the company for the following uses.

As a catalytic agent in one or two phase polymerization. (t-Butyl Hydroperoxide has proved to be an excellent catalyst for polymerizing styrene, as well as certain elastomers such as buna S.)

As a drying accelerator for heavy fuel oils used in Diesel engines.

As an accelerator in the curing of synthetic resins.

As an accelerator in the vulcanization of certain synthetic rubbers.

As an oxidation agent for laboratory purposes.

Properties of t-butyl hydroperoxide are listed as follows:

Molecular Weight	90
Specific Gravity at 25° C. (60% concentration)	0.859
Boiling Point (60% concentration)	82-83° C.
Freezing Point (60% concentration)	—30° C.
Flash Point (60% concentration)	18.3° C.
Refractive Index at 25° C. (60% concentration	1.3960
Available Oxygen (60% concentration)	10.66%
Color	Water White
pH of 1 part 60% conc. in 10 parts water	4
Stability:	
Completely stable up to	76.6° C.
Solubility:	
60% concentration in water	11%
Water in 60% concentration	5%
In short chain aliphatics	Excellent
In aromatics	Excellent

New Textile Chemical

National Oil Products Co., has announced a new compound, named "Napco Nap," which is a product formulated to aid the napping of fine fabrics especially. The principle involved is that the fibers will yield to napping without being pulled out. Napping usually results in a 5-7 per cent loss of fiber and a general weakening of the fabric strength. This electro chemical compound will impart utmost softness and loft to fabrics, requires fewer runs on the napper, produces a fuller, deeper napped surface, reduces static and

cuts down fiber breakage and fly. This compound can be used on all fabrics irrespective of the kind of fiber present. It works equally well on rayon and other synthetic staple fibers, cotton, wool, camel hair, etc. It is said to be especially suitable on mixed stock of low serrative power such as viscose staple fiber and "Aralac." It is recommended on white goods.

The compound is a paste and must be completely dispersed in warm water in a 3 to 1 volume. It is heated to 180° F. and stirred until solution is clear. The solution must not be boiled. It assumes a positive polarity in aqueous solutions and will exhaust itself on the goods in 5 to 10 minutes at a temperature of 90° to 120° F. There is no oily feel or odor. A quantity of 6-8 ounces per cut is all that is needed. The mixture is added to the last rinse after washing or dyeing and run for about 10 minutes. Double the amount is needed for dry napping. It is compatible with Ammuno 51, the moth proofing agent.

Armature Balancing Compound

The Sterling Varnish Company, has announced R-943 Balancing Compound, a material designed for the balancing of electric motor armatures.

It is supplied in paste or soft putty form, so application can be made easily with the hands or with a knife. It will set in air at room temperature in about two hours to a condition such that it will not be affected by subsequent application of insulating varnishes. It does not, however, attain its maximum hardness and mechanical strength unless it is subjected to a temperature of 135° C.

Although Sterling R-943 Balancing Compound was originally intended for the balancing of rotating parts, it is claimed to be a highly interesting material for certain types of filling operations, such as coil margins and small interstices where good adhesive qualities, a low coefficient of expansion, and high mechanical strength are required.

Normally supplied with buff color but may be furnished in black if desired.

Rubber Plasticizer

A chemical plasticizer developed in the Du Pont laboratories is helping to solve the problem of making GR-S synthetic rubber behave more like natural rubber in the fabrication of tires, it was reported at the annual meeting of the Rubber Chemicals Division of the American Chemical Society.

One of the big differences between natural rubber and GR-S (familiarly known as Buna S type) is that the synthetic product is much more difficult to soften or plasticize by rubber mills and mixers prior to incorporation of the compounding ingredients.

Data were presented that showed these milling properties were improved by the plasticizer known as R.P.A. No. 5. The chemical was developed by Drs. B. M. Sturgis and J. R. Vincent, of the Du Pont Company's Jackson Laboratory, at Deepwater Point, N. J. The performance data were reported by two other Du Pont chemists, Dr. Arthur M. Neal and Mr. Pieter Ottenhoff, of the Rubber Chemicals Laboratory of the Du Pont Company.

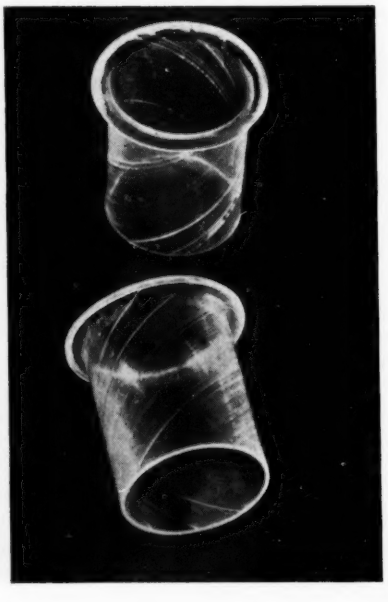
Natural rubber begins to soften as soon as it starts through the milling and mastication process just as a stick of gum begins to soften as you chew it. Dr. Neal and Mr. Ottenhoff showed through laboratory tests that, in the absence of the chemical plasticizer the GR-S, however, will decrease tremendously in workability during the first ten minutes of milling at high temperature. But upon further milling, this stiffening effect disappeared. It was as though your gum became stiffer as you chewed, and then began to soften.

When the R.P.A. No. 5 was added, to the extent of two per cent, this period of stubborn stiffness disappeared and the synthetic began to soften up properly as soon as the milling was started. Furthermore, instead of higher temperatures decreasing the workability, as they had in the absence of the plasticizer, they actually speeded up the processing when the plasticizer was added.

Acetate Grommets

Sun acetate grommets produced by Precision Paper Tube Co., are being used to good advantages in aircraft, hydraulic controls, small motors, lamps and many purposes for which small grommets are used.

Manufactured of acetate film, spirally wound and laminated for greatest strength,



these grommets provide the exceptional insulating properties combined with the non-shatterable toughness of the material, according to the producer. Light weight, resistance to oil, moisture and all climatic conditions are also advantages.

The main feature is the ease of assembly made possible by Precision's method of manufacture. Grommets are supplied with one end spun, inserted in place, and subsequently spun over on standard drill press equipment with special tools supplied by the company.

Cleaning Composition

A new industrial cleaning preparation called "Penetone" has been put on the market by the Penetone Company. The new product which is nonflammable is said to be especially applicable for the removal of film and other accumulations caused by the use of fatty soaps. Since it leaves no film of its own, a perfectly clean surface results from its use according to the company. In addition to floors the new product is recommended for cleaning the hands and as a quick degreaser of machinery.

Improved Synthetic Rubber

An improved general purpose synthetic rubber of the butadiene type, resulting from discoveries made in the laboratories of The B. F. Goodrich Company, Akron, Ohio, was announced recently by John L. Collyer, B. F. Goodrich president.

Through the co-operation of Col. Bradley Dewey, Rubber Director, who had urged all possible speed in the development of additional new and improved types of synthetic rubber, permission has been obtained from appropriate government agencies so that substantial production of the new material can be undertaken immediately in one of the plants being operated by The B. F. Goodrich Company for the government.

This development, Collyer said, is one of the company's contributions to the co-operative research program undertaken under government sponsorship, and details have been fully revealed to the Rubber Director and to the other rubber companies engaged in synthetic rubber manufacture. For reasons of security, complete information on the new material will not be available to the public until after the war, it was stated.

Collyer said that introduction of a certain abundant natural material into rubber-making processes resulted in this superior synthetic, and that the improved rubber approaches natural rubber in characteristics during processing.

Collyer said that the fundamental development work involved in making this synthetic rubber had been done, but that it

Keeping Health-Faith

with our Armed Forces and the Nation

MEDICAL and sanitation experts are maintaining the health of our armed forces and civilians at an all-time, war-time high. WILSON *Pulsafeeders* are primary instruments in their operations.

Their dependability, efficiency and economy were so widely known when catastrophe came, thousands were rushed to all parts of the world to help meet the emergency in health maintenance.

Even in remote, heavy-contamination regions, they do heavy duty in water supply and sanitation plants. They help speed development work in medical, food, chemical and oil laboratories. They carry on in plants with flow-control for speed *and accuracy* in volume production.

Their use applies almost 100%, directly or indirectly, to health maintenance; and we tell you with utmost pride that, with re-energized, *uninterrupted,* painstaking effort, our organization has kept health-faith with our armed forces and the nation. All honor to these selfless, conscientious workers!

WILSON PULSAFEEDERS — What They Are And What They Do

WILSON *Pulsafeeders* are eminently superior, almost infallible flow-controls to handle liquids of any nature in any pre-determined quantity from one cubic centimeter to four hundred or more gallons per hour. Accuracy, in most instances, is guaranteed at better than ⅛ of 1% through manually operated and/or automatic controls for single or multiple liquids. WILSON *Pulsafeeder* Systems are so flexible and adaptable, they satisfy an almost limitless range of requirements.

Let us send you details of their packless, positive-displacement piston action . . . of the absence of packing glands and breakable diaphragms . . . freedom of contact between working parts and flowing liquids. Let us tell you how they will meet your specific requirements for capacity, accuracy, economy, durability and dependability, as those requirements apply to chemical proportioning, food and other processing, laboratory work, water and sewage treatment . . . or to the handling of problem liquids such as acids, volatiles, slurries, etc., in mono- or multi-flow . . . and about our capacity to supply almost any need in Automatic Filling Machines because of our acquisition of Clevon Products Co. (Est'd 1903)

AD NO. K-8

WILSON CHEMICAL FEEDERS, INC.

215 CLINTON STREET (P. O. Box 998) BUFFALO 4, N. Y.

ESTABLISHED 1923 . . . WITH EXPERIENCE IN ALLIED LINES SINCE 1914

would be several months before it could be expected that the availability of the new material would help to solve some of the serious problems involved in making heavy-duty tires of synthetic rubber.

Consequently use of the new material cannot be a factor in relieving the tight situation in heavy duty tires forecast for the next few months, Collyer emphasized, adding that maximum conservation of tires now in service must be practiced.

Tires made of this rubber, now undergoing extensive tests, show reduction in tread cracking and increased resistance to road wear. These are qualities in which other synthetic rubbers have shown deficiencies especially in large tires for heavy service.

Having greater tackiness, or adhesive properties during processing, this rubber lessens manufacturing difficulties experienced in handling other substitute rubbers.

The B. F. Goodrich development is also said to shorten the amount of time now required to prepare synthetic rubbers for product manufacture, a factor of importance throughout the rubber industry now producing at near-capacity to meet mounting war and essential civilian requirements.

This man-made rubber can be produced in existing government plants without the necessity of major capital expenditures or changes in present equipment.

Work on this development was started by Dr. Charles F. Fryling of the B. F. Goodrich research staff more than two years ago in the company's laboratories and has been continued in Akron and elsewhere ever since in the effort to contribute a superior material for general use in the production of war products and civilian truck, bus and passenger car tires.

Benzene Sulfonamide

The Wyandotte Chemicals Corp. has recently announced its production of benzene sulfonamide in both technical and purified grades.

According to the company's statement this chemical reacts readily with aqueous alkalies to give reactive salts of interest in synthetic research. It exhibits many of the typical reactions of amines and is quite stable. Its properties are listed as follows:

	Technical Grade	Purified Grade
Physical Characteristics	Light tan, granular material with faint odor.	White crystals, almost colorless
Melting Point	140–156° C.	154–154.5°C.
Solubility in Water	Approximately same as purified grade	0.25% at 10° C. 2.0% at 50° C. 25.0% at 100° C.
Solubility in Organic Solvents	Approximately same as purified grade	Soluble in most of the ordinary organic solvents
Purity	85–90%	98–100%

Insulating Varnish

The Sterling Varnish Company has announced the development of an insulating varnish which it claims is the most flexible that has ever been offered to the electrical industry. It is designed for applications that demand great lead wire flexibility in addition to high mechanical strength.

The new product, called R-851, is said to show little progressive hardening when the dried film is exposed to the air and is recommended for coating armature and stator coils that will be stored for long periods before assembly.

This clear baking varnish dries completely throughout when baked at a temperature of 135° C. The dried insulation is oilproof and affords a protection that is water, acid, and alkali resistant. It is recommended by the manufacturer for electrical equipment wound with glass-covered wire designed to operate at exceptionally high operating temperatures.

Chemical Method Aids in Size Reduction

A novel process has been patented by Shawinigan Chemicals Ltd. for the inexpensive preparation of finely powdered resins containing aliphatic hydroxyl groups, such as vinyl or cellulose derivatives.

The method comprises the addition of boric acid to the plastic to form a boric complex so that the resin is rendered non-plastic and brittle. The embrittled resin is then readily pulverized and the boric acid removed from the compound by simple water extraction.

Thus, it is claimed, finely powdered, dense, resins, substantially free from boric acid, and of original plasticity, are obtained.

Rust Preventive

A combined rust preventive, cleaner, and fingerprint neutralizer has been announced by E. F. Houghton & Co., for use in internal plant protection of steel parts between processing or machining operations.

The new product called, Cosmoline No. 805, is intended to neutralize the causes of corrosion, particularly acid perspiration from workers handling the parts. It is also said to be effective in protection against corrosion caused by a chemical atmosphere, fumes, etc., or high humidity.

Cosmoline No. 805 is a fluid product which conforms to requirements of Ordnance Technical Manual TM 38-305. It will meet and exceed 24-hour salt spray and 100-hour humidity tests.

Moisture-Resistant Lacquer

Communications equipment that soon became useless in tropical climates is now being protected from high humidity and fungus growth by a new lacquer, developed by Maas & Waldstein Company, according to a recent company statement.

When troops first entered the tropics, moisture saturated ground signal equipment and provided an ideal breeding ground for fungi. These growths absorbing and holding water like blotting paper, covered parts of equipment and caused short circuits.

At the request of the Signal Corps for assistance on this problem, Maas & Waldstein developed a lacquer that is moisture-resistant, has high dielectric strength, and retards the growth of fungi. It is now being used on Signal and other communication equipment at our tropical bases.

The new lacquer, marketed as Dulac Fungus-Resistant Lacquer No. 86—, may also be used to treat communications equipment before it is assembled and shipped to the tropics. Complying with U. S. Signal Corps Specification No. 71-2202-A, it is a clear, quick-drying lacquer that may be applied by spraying, brushing or dipping.

Albumen Substitute

A substitute for albumen in fixing pigments preliminary to printing on rayon has been announced by the De Paul Chemical Company, Inc. According to reports, tests of the new material have been completed satisfactorily and the company will be in volume production in a short time.

Water-Repellent Fabric

A new type of water-repellent cotton fabric, whose water-resisting properties are due largely to the unique construction of the cloth, is described in *Textile World*.

Military authorities are expressing keen interest in the fabric, which was developed by Dr. F. T. Peirce of the British Cotton Industry Research Association, at Shirley Institute. Reports from England indicate that the Shirley method is being employed in the manufacture of fire hose, canvas, and raincoat fabrics, and recently some experiments have been carried out in this country on production of similar types of water-repellent fabrics.

"Water Buffalos" *are rough on rats!*

Big, tough, deadly . . . "Water Buffalos," the amazing new war vehicles military experts have called "the answer to the Pacific warfare!" Heavily armed and armored amphibious tanks, "Water Buffalos" swim through the sea, climb over coral reefs and charge up on the beach . . . ride over barbed wire, barricades and pillboxes, spraying death as they go. It can now be told that the Army, Navy and Marines used these "Water Buffalos" in great numbers in many amphibious operations in the South Pacific area.

These "Water Buffalos" were designed,* engineered and manufactured by Food Machinery Corporation. The extraordinary "know how" required to produce them was developed through 59 years of building equipment. This same creative ability is on the job today, planning many improved equipment items for America's great food industries.

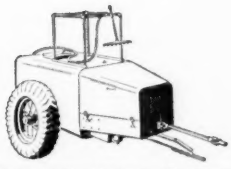
**In cooperation with Bureau of Ships, U. S. Navy.*

LAKELAND AND RIVERSIDE

FOOD MACHINERY CORPORATION

EXECUTIVE OFFICES: SAN JOSE, CALIFORNIA

Riverside Division...Citrus Packing Equipment, Automatic Box Making and Lidding Machinery, Fruit and Vegetable Protective Processes. Riverside, Calif.

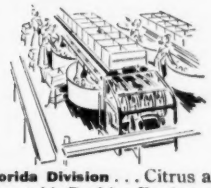


Bean-Cutler Division. Sprayers, Dusters and Packing House Equipment for Fruits & Vegetables, Fog Fire Fighters, Turbine Pumps. San Jose, California.

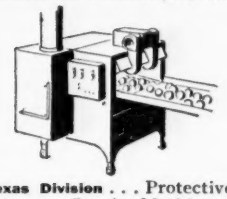
Niagara Sprayer & Chemical Co. . . . Insecticides for protecting crops from insects and disease. Middleport, N. Y.; Jacksonville, Fla.; and Burlington, Ont., Can.

FMC Divisions *and Typical Products*

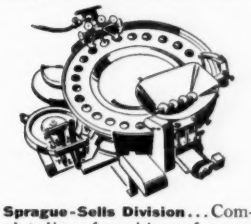
John Bean Mfg. Co.... Fog Fire Fighters, Bean Royal Spray Pumps, Automotive Service Station Equipment. Lansing, Mich.



Florida Division . . . Citrus and Vegetable Packing Equipment, and Food Protective Processes. Dunedin and Lakeland, Florida.

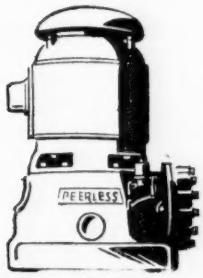


Texas Division . . . Protective Processes, Canning Machinery, Fruit and Vegetable Packing Equipment. Harlingen, Texas.



Sprague-Sells Division... Complete line of machinery for canning foods. Hoopeston, Illinois.

Anderson-Barngrover Division... Complete line of machinery for canning foods. San Jose, Calif.



PEERLESS PUMP DIVISION. . .Deep well turbines, hi-lifts and pumps handling water for every purpose. Los Angeles and Fresno, Calif.; and Canton, Ohio.

"In his experiments," says *Textile World*, "Dr. Peirce worked on the hypothesis that if the cotton fibers in a fabric were in such a condition that they could swell when moistened, they would, in contact with water, block up the interstices in the cloth, thereby making it water-repellent and water-resistant."

Resin Exchange for Tartrate Recovery

An announcement that synthetic anion exchange resins are capable of recovering 85 per cent of the valuable tartrates formerly lost in the treatment of grape winery waste liquor at a chemical cost of less than four cents per pound and at the rate of almost five pounds of acid per cubic foot of exchange material is made by the U S. Department of Agriculture. In the recovery of war-scarce tartrates which are extensively used in the tanning and beverage industries, in baking powders, photographic materials and textiles, as many as 150 successive exchange cycles were carried out with these resins in the U. S. Department of Agriculture's Western Regional Research laboratories without detracting from their operating efficiency.

Amberlite IR-4, an anion exchange resin, developed by the Resinous Products & Chemical Co. of Philadelphia, has been used for some time in water conditioning, in the purification of formaldehyde, in increasing sugar yields, and the purification of pectin is being used in this new application.

Tartrate occurs in brandy-still slops as a very dilute solution and is accompanied by large amounts of extraneous materials, among which other acids and salts, pigments and colloidal matter are the most prevalent. To recover a tartrate of high purity in satisfactory yield, it is necessary first to separate the tartar and then to concentrate it so that calcium tartrate can be precipitated in sufficient quantities to make the process economically practical.

Both ends can be attained through the use of an anion exchanger which is placed in beds similar to filter beds. When brandy-still slop is passed through the exchanger the tartrate remains affixed to the resin while most of the unwanted material passes through as waste. When the exchanger bed has attained a capacity load, a solution of sodium chloride is passed through it to remove the tartar as a sodium tartrate solution of about 5 per cent concentration. At the same time the sodium chloride solution prepares the bed for another adsorption cycle.

The calcium tartrate is precipitated from the sodium chloride regenerant solution by means of calcium chloride. This process yields calcium tartrate of excellent purity, and recovery amounts to 85 per cent or even more in the case of dilute slops. The operation can easily be handled by one man with the necessary technical supervision or perhaps some help with the precipitations. Chemical reagent costs at present prices amount to about 4 cents per pound of tartrate recovered according to the company statement.

Synthetic Elastomer Developed in England

A new synthetic rubber-like material called Texylon has been developed in England by Scott Bader & Co. The new elastomer is said to be based on vegetable oils. It is an almost colorless, rubbery mass that can be milled, compounded, and cured much like rubber, but is self-curing and thus requires no sulfur.

The new material is made in several different grades which in general appear to have lower tensiles than natural rubber, but resist oils and solvents, are non-aging and adhere well to metal. The manufacturer recommends the material for the manufacture of articles like sealing rings for jars and cans, shock absorbers, gaskets and packings, flooring, industrial linings, etc.

Fireproof Plastic Upholstery for Navy

New plastic fireproof upholstery, developed by United States Rubber Company, has been ordered by the Navy as mandatory equipment for all combat ships, to provide added protection against fire, according to a recent company statement. The upholstery covering which will be used on furniture of all new Navy combat ships and old ships returning to service after repairs, is non-smoldering, gasoline and oil-resistant and extremely durable under wide temperature ranges. It is also being used as turret lining and seat covering in both bomber and fighter planes.

Because fire and smoke caused loss of combat ships, the Navy asked United States Rubber Co. during the fall of 1941 to develop a fireproof covering for berths that would eliminate the hazard of burning or smoldering mattresses and bed covers.

Through the use of synthetic resins laboratory technicians in the company's Mishawaka, Indiana plant perfected a fireproof compound to be used as a coating on a fireproof base fabric—developing for the first time a coated fabric that was fireproof as well as waterproof. These fabrics were delivered to the Navy in December, 1941, and were successfully tested on combat ships. A few months later the material was improved to include resistance to oil, gasoline, salt water and perspiration and provide durability over wide temperature ranges. It had to pass many rigid tests similar to those of the fireproof upholstery.

Use of these fireproof berth covers for bedding material on all Navy vessels has been a great aid, it is said, in cutting down fire, smoke and fume hazards and made it easier for fire-fighters to get to the source of many fires on shipboard.

Removing Caustic in Textile Finishing

A process using bicarbonate of soda for removing excess caustic from goods in various textile finishing operations has been developed by The Mathieson Alkali Works. In this process, the caustic and the bicarbonate react to form the normal carbonate, which is easily washed out of the goods.

Heretofore the practice has been first to neutralize the excess caustic with a "sour," usually sulfuric acid. Then the acid was in turn neutralized with soda ash, or normal sodium carbonate.

It is claimed that the new process, by eliminating the use of acid, makes unnecessary the use of acid-resistant equipment, minimizes hazards to workers and reduces the number of steps in some processing operations. The quality of the goods is said to be improved by the use of hot washes, which are entirely safe in the bicarbonate process.

The applications in which the process has already been found successful include removal of caustic after continuous jig scouring or mercerizing of open-width heavy fabrics, after warp yarn mercerizing, after kiering and after caustic steaming.

New Pyro-Welded High-Frequency Material Developed for Insulation Purposes

The Laboratories of the International Products Corporation have announced the development of Pyro-Plastics "PemQue," an inorganic Pyro-Welded material especially designed for insulating purposes in the field of electronics in high frequency requirements.

In the molding of PemQue a Pyro-Welding process is employed, which permits the components of PemQue to be "welded" to such a density that machining to tolerances of .005 is practical.

According to the company one of the most desirable features of this new product is its very high resistance to mold and fungi growth, an important characteristic for any manufacturer of electrical equipment whose products find their way into the tropics.

A LITTLE NUCHAR *DOES A LOT*

but sometimes it takes a lot *to do a little*

Nuchar Active Carbon is being used for big tough jobs in many industries and for delicate duties too. For example: In the water purification field, one pound of Nuchar Active Carbon in many instances is sufficient to treat and make palatable 100,000 gallons of water, while in the medicinal field approximately a ton of Nuchar is used as a concentration and purification medium to produce a pound of penicillin.

In the Chemical Process Industries Nuchar is used extensively to keep liquids at required purity levels and to remove *by adsorption* unwanted impurities. Because it is chemically inert Nuchar Active Carbon purifies without causing molecular alteration or chemical reaction of the product treated.

Your technical staff will find active carbon a useful product in your process. Consult with us regarding the quality of Nuchar best fitted to your needs and we will send you a sample.

Nuchar Active Carbons ★ *Abietic Acid* ★ *Snow Top Precipitated Calcium Carbonate* ★ *Liquid Caustic Soda* ★ *Chlorine* ★ *Lignin* ★ *Liqro Crude Tall Oil* ★ *Indusoil Distilled Tall Oil* ★ *Tall Oil Pitch* ★ *Sulphate Wood Turpentine*

NUCHAR

INDUSTRIAL CHEMICAL SALES

DIVISION WEST VIRGINIA PULP & PAPER COMPANY

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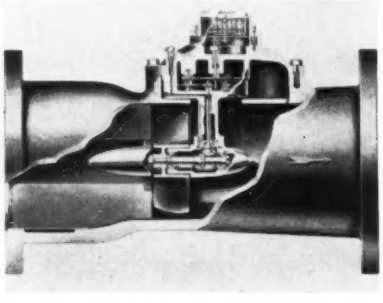
NEW EQUIPMENT

Propeller Type Flow Meter QC 385

Builders-Providence, Inc., division of Builders Iron Foundry has announced a new propeller type flow meter for main line metering which is claimed to have a number of improvements, including streamline Venturi construction. This unit, called a Propeloflo Meter, has an 8-blade bakelite propeller molded in one piece. Rotation is transmitted through spur and bevel gears. Shafts rotating in ball bearings assure maximum power to drive indicating and recording devices or proportioning chemical feeders. A Venturi throat evenly distributes the force of the flow against the full area of the propeller, resulting in improved accuracy throughout an exceptionally wide range of flow. Spiral flow is eliminated by straightening vanes just upstream of the propeller.



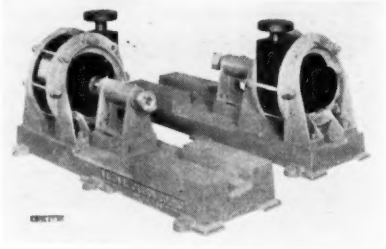
The propeller hub, bracket and nose are streamlined to reduce flow disturbance and divert fine grit, sand or scale away from the mechanism. Engineers will find the unit easy to service, it is said, owing to its "one-shot" lubrication system, the readily accessible stuffing box, and the ease with which the propeller mechanism may be removed from the line for inspection. A blank cover may be installed when the meter is removed.

Corrosion Resistant Carbon Pump QC 386

A corrosion resistant centrifugal pump designed by National Carbon Company, Inc., for the chemical process industries is now out of the "experimental" stage and has been standardized in three sizes.

Constructed of chemically inert Karbate material, which is a carbon stock made impervious to seepage of liquids under high pressure, the pumps have shown excellent performance and serviceability under plant operating conditions in a variety of chemical applications.

Their resistance to practically all corrosive fluids, including acid mixtures such as HCL and H_2SO_4, gives the Karbate pumps a long life span and at the same time avoids metallic contamination of liquids being handled. Karbate pumps may also be used without danger where sudden variations of fluid temperature induce thermal shock.



The largest of the three pumps operates against a 100-foot head. They are so engineered that from inlet to outlet the liquids are in contact with the Karbate material. The Karbate sleeve covers the steel shaft, and is cemented to the impeller disc rather than to the shaft itself. The shaft end is covered with the Karbate cap. The pumps are sealed with a rotary faced seal, thereby eliminating the maintenance problems inherent in stuffing boxes.

Sulfur Determinizer QC 387

Numbered among many laboratory procedures for which the development of improved apparatus has been accelerated by the war program, is a new sulfur train, originated by the Universal Oil Products Co., and built by the Precision Scientific Co. The method, identified as U.O.P. Method H-201-43-A, determines small quantities of sulfur, 0.0002% to

0.05%, in combustible liquids and gases. The samples are burned in a stream of purified air and the products of combustion absorbed in a solution of sodium hypobromite. The sulfur is then determined as sulfate by turbidimetric measurement of colloidal barium sulfate.

The apparatus consists of an air-pressure regulator and filter pressure gauge, air purification furnace, cooling tank, gas scrubbers, water regulator, moisture trap and bank of eight A.S.T.M. sulfur lamps.

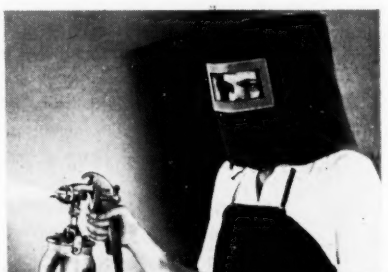
Compressed air controlled by a pressure reducing valve, is reduced to two psi, then passes through an activated charcoal tower and into the air purification furnace containing a heated stainless steel U-tube 1" diameter by approximately 4 ft. long filled with quartz chips.

Air leaving the furnace is cooled to approximately room temperature by passing through a water jacketed copper-coil condenser at the furnace outlet. The air at room temperature passes successively through three scrubbers—water, sodium hypobromite, and sodium hydroxide—then through a constant pressure regulator, into a moisture trap fitted into a vacuum bottle, and finally into a distribution manifold serving the eight A.S.T.M. sulfur lamps.

For the determination of sulfur in gases, the apparatus includes eight Duralumin weighing bombs, 35 ml. capacity for connecting to the sulfur lamps.

Fresh Air Hoods QC 388

A lightweight, air-supplied hood to protect workers in paint, chemical, woodworking, metallizing, finishing, and allied industries has been announced by the Wesley A. Gibbons Co. Called the "Taeco" hood, it guards the eyes, ears,



face, neck, and respiratory organs from harmful and irritating substances, mists, vapors, fumes, and dusts. It is designed to afford safety, comfort, and freedom of body movement and to allow easy replacement of all parts. This pliable hood weighs only slightly more than a man's felt hat and is fitted with replaceable forehead pads.

Compressed air at low pressure, from the same supply used to service a spray gun or similar equipment, is fed into the hood through a distributing tube which is held in position at the operator's waist by a belt clip. A removable diffuser allows the air to expand and discharge at the top of the hood from where it floats down over the operator's head.

Two models of Taeco hoods are offered. One, called the Vapo hood, is designed for use principally for spraying

paint and other liquids. The eye mask is cut out to prevent hampering of operator's vision by mist. Air flowing out through the eye opening keeps vapors from entering.

The other, called the Fumo hood, is designed for use in industries like metallizing or woodworking where irritating dusts or fumes are prevalent. Its eye mask is closed and the air escapes at the neck.

Fire Extinguisher QC 389

Outstanding advancement in extinguishing industrial fires is claimed for the new "All-Out" Fire Extinguisher manufactured by the National Powder Extinguisher Corp. Designed especially to extinguish both flammable liquids and fires of electrical origin, the chemical ejects a stream of "All-Out" Dry Chemical which, when activated by heat, forms a dense, fire-smothering cloud over a flaming area

up to 18 feet. The insulating qualities of the cloud help guard against re-flash, and create a heat-deflecting screen between the operator and flame, permitting close range attack with greater safety and no heat discomfort. The chemical, a non-conductor of electricity, is said to be harmless to humans and delicate, mechanized parts of motors or machinery.

Blackmer Truck Pump QC 390

The details of a new truck-mounted pumping unit have been released by the Blackmer Pump Co. While the new pump differs materially in appearance and in certain details of design, from the present model, the "Bucket Design," swinging vane principle of operation that characterizes all Blackmer Pumps, is used. The outstanding construction feature appears to be the double bearing arrangement, one on each side of the rotor. This placement of bearings should virtually eliminate shaft "whip" and distortion, according to the company statement.

The new Blackmer truck pump is compact and light in weight, making it suitable for mounting on small trucks. It is designed for standard power take-off drive and has a capacity of 35 GPM at 525 RPM. Normal operating pressure is 45 psi. A relief valve of Blackmer design, built into a pump casing, will bypass the entire capacity of the pump without shock or end-thrust on the working parts, and is free from "chatter." Suction and discharge connections are tapped for 1½" iron pipe.

New Oscillograph Model QC 391

To facilitate the investigation of transient as well as recurrent phenomena over a wide frequency range, Allen B. Du Mont Laboratories, Inc., have announced their new Type 247 Oscillograph.

This instrument utilizes the new Army-Navy preferred Type 5CP1 cathode-ray tube with intensifier electrode, operated at an overall accelerating potential of 3000 v. High-intensity patterns are obtained on the 5" diameter screen. The medium-persistence green screen is standard. If a permanent record of transient phenomena is required, the instrument may be supplied with short-persistence blue screen for high-speed photographic recording, or with the long-persistence green screen for visual observation of low-speed phenomena.

The sweep frequency range has been extended down to one-half cycle per second providing a wider range of sweep operation. Thus it may be used for observations on low-speed machinery and for other low-frequency functions. The time-base provides recurrent, single or repetitive sweep operation. An unusual beam control circuit is used with single sweep operation, to darken the screen except during the actual sweep cycle, providing a reduction of background illumination and resulting in photographs of greater contrast.

Megohm Meter QC 392

Essentially a direct-reading ohmmeter but incorporating a vacuum-tube voltmeter in order to cover relatively high resistance values, Model L-2 Megohm Meter announced by Industrial Instruments, Inc., offers several new features for this type of instrument. In addition to laboratory usage, especially for checking leakage resistance of cables and insulating materials, locating defective insulation in equipment, and measuring carbon resistors, it is adaptable to production testing, particularly of radio condensers.

Entirely self-contained, it operates on 110-volt 60 cycle A.C. The instrument is mounted on a sloping panel for convenience in production testing. Arrangements are provided for the rapid charging of condensers under test. An external battery voltage supply may be used where voltages other than the self-contained 200-volt supply, are desired. The instrument may be satisfactorily operated with external voltages up to 1000.

Etcher and Demagnetizer QC 393

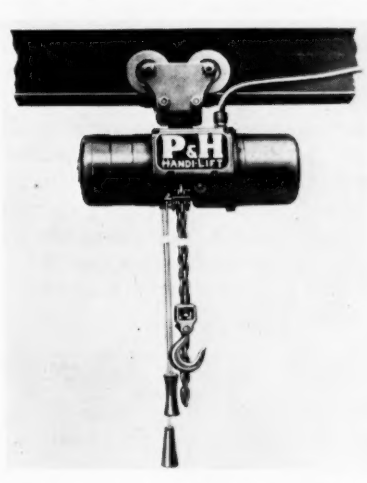
The Ideal Commutator Dresser Co. has developed a new tool that is ready for instant use as either an etcher or demagnetizer.

For etching—14 Heats (Lo-90, 150, 200, 250, 350, 450, 600; Hi-300, 400, 500, 650, 850, 1100, 1350 watts) are provided by "Hi-Lo" tap and 7 point switch. This gives a wide range for marking all iron, steel and their alloys from small delicate parts up to large smooth castings. When using ground clamp to etch large parts, the "keeper" must be removed from front of case and placed on work-plate across transformer poles. An indicating lamp glows brighter as each higher heat is used.

To demagnetize, it is only necessary to turn the switch "On" to either No. 1 or No. 2 position and proceed as with ordinary demagnetizer. Maximum rating is 5.5 ampere. Over-all pole area, 13½ square inches.

Electric Chain Hoist QC 394

Increased utility is claimed by the Harnischfeger Corp. for its new "Handi-Lift" electric chain hoist by virtue of its quick interchangeability to bolt, hook, or trolley mounting, with changeover requiring the loosening of one bolt only. Also, in trolley service, it can be suspended either parallel or crosswise to beam for greater flexibility. Fully en-

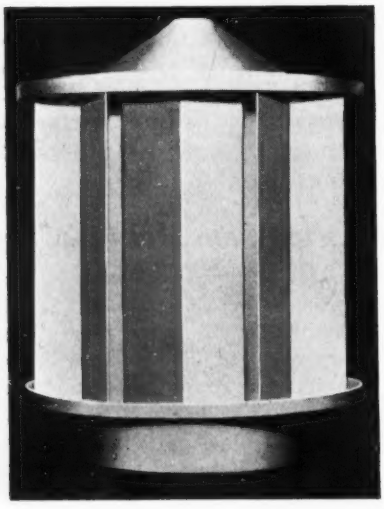


closed construction is said to permit use under any condition of weather, dust, moisture, or acid fumes. While the unit is rated at 500 pounds, the hoist motor is claimed to supply high reserve capacity. The chain is proof-tested for 1800 pounds. Operation is by handy pull cord actuating a simple level toggle arrangement, which leaves one hand free to guide the load. The chain wheel, which is forged of high carbon steel and heat-treated, is splined

to the drive gear. Over-travel of hook at both upper and lower limits is prevented by a zinc die cast safety limit stop which also actuates control for raising and lowering loads. Dual braking is provided by a large spring-set electric motor brake which automatically releases when hoist is operated and sets instantly with shut-off currrent. Lowering control is by dynamic means supplemented by the spring set brake which holds the load, should current fail.

Wind Driven Exhaust Systems QC 395

Suitable for gravity and mechanical exhaust systems in marine industrial and commercial applications, this new wind-actuated exhauster gives positive ventilation regardless of wind direction or velocity. There are no moving parts, hence



the Agitair exhauster is claimed to give long life with efficient service. The unit is weather-proof and light-proof, and provides positive elimination of down draft.

Many standard sizes are available, and special arrangements can be provided wherever required by the application. Units with water-tight dampers are made for marine use. Agitair exhausters also function satisfactorily when installed as port-hole type ventilators, according to the company.

Heating Tank QC 396

A new type of portable heating and dipping tank, including an acid compartment and differing from ordinary dipping tanks in a number of basic respects, has been developed by the Heil Engineering Company.

Known as a "utility tank" and designed for a wide variety of uses, the tank is divided into three compartments which are basically designed for degreasing, rinsing and pickling. However, it is also said to be suited for etching, plating, metal coloring, waxing, fluxing, oiling, lacquering, dip painting, rust removing, macro and salt spray testing, anodizing, pilot and laboratory operations, and photo finishing.

One of its features is a dual purpose cover and shelf, which is thoroughly acid proofed and arranged to drain into the tank.

To operate the tank, it is necessary only to fill the compartments and plug the flexible extension cord into any 110- or 220-volt circuit. Compartment No. 1 is furnished with a standard heating unit for hot alkaline degreasing compounds, compartment No. 2 is for cold rinsing, and compartment No. 3 is lined with Plast-O-Ply, an acid resistant coating suitable for pickling acids such as sulfuric, muriatic, phosphoric, hydrofluoric and oxalic, in dilute solutions. This lining is also satisfactory for most electroplating chemicals, including alkali, acid or salt compounds; for acid cleaners used on aluminum and magnesium; and for corrosive fluxing salts.

Heating units can be supplied extra for all three compartments if required. An insulating wall between compartments 1 and 2 prevents heat loss from compartment 1 when compartment 2 is used without heat. All compartments are equipped with bottom and overflow outlets. Heating units are equipped with automatic temperature control.

Electric Tachometer QC 397

A self-energized Tachometer that can be used either as a "Hand Type" or "Separable Type" has been announced by the IDEAL Commutator Dresser Company.

Essentially the IDEAL Tachometer consists of a small generator, coupled electrically to an electric meter. The generator itself consists of a small, permanent "Alnico" magnet rotor which is mounted on precision sealed ball bearings and capable of continuous operation at any speed within limit of the meter.

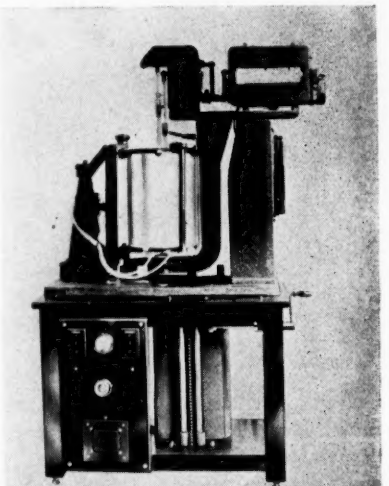
The meter or indicating instrument is a rectifier type, including a sturdy D'Arsonval movement. It is capable of withstanding a momentary overload up to four times the maximum speed indication without damage. The meter is provided with two scales—"Hi" and "Lo." The "Hi" scale indicates the maximum reading obtainable. A small switch incorporated in the meter case provides for easy changing from "Hi" to "Lo" range.

The generator and meter are made as distinctly separate elements and coupled together by a precision made bayonet lock. The units may be used together as a "Hand Type" Tachometer, or for many applications including permanent mounting, the generator and meter may be separated, "Separable Type," and connected only by a two conductor electric cord.

Dilatometer QC 398

The Bristol - Rockwell Dilatometer, Model A-134, recently announced by the Bristol Company is a direct reading dilatometer which records temperature-dilation changes and temperature-time changes simultaneously in ink during heating and cooling cycles of ferrous and non-ferrous metals, ceramics, and many other materials in solid form.

The two records are made on a chart with rectangular co-ordinates for ease of interpretation and filing. The ball bearing multiplying mechanism exerts very light pressure on the sample and provides smooth accurate records of the temperature-dilation of the sample.



The split furnace, which is designed for temperatures to 2500° F can be pulled away from the sample for quenching or cooling without disturbing the record, and the inside dimensions allow the use of any size or shape of sample up to 1⅝" diameter by 5 inches long,

The Bristol-Rockwell Model A-134 Dilatometer can be used to determine: critical points of carbon steel, coefficients of expansion of metals, thermal composition of steels, and heating rates and heat saturation.

Twin Pumping Unit QC 399

Design and operating data on a new twin pumping unit has recently been released by the Blackmer Pump Co.

The specifications of the new unit are as follows: Two standard Fig. 4202, No. 50 pumps mounted on a cast bedplate and

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We are always ready and willing to give you advice on the care and maintenance of your valves. But valve failures are not always due to lack of knowledge—or neglect.

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Dependable Valves Since 1846

Cincinnati 22, Ohio

POWELL Flush Bottom Tank Valves are designed to drain metal tanks (with or without jackets), glass or vitreous-lined tanks, and autoclaves. They are available in acid-resisting bronzes, Monel metal, pure nickel, various grades of stainless steel, cast iron and cast steel, and can be supplied in all sizes for various services.

The Flush Bottom Tank Valve shown above is equipped with the POWELL Patented Seat Wiper. This ingenious regrinding device—patented in 1935—is another example of how POWELL Engineering helps to solve difficult and unusual flow control problems. It assures tight closure of valves handling heavy viscous or gelatinous media or suspensions in solution that precipitate over seat and disc faces. POWELL Globe, Angle and "Y" Valves can be equipped with the Patented Seat Wiper.

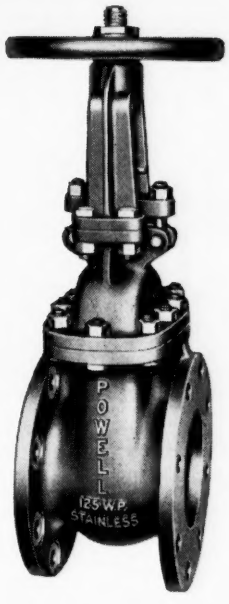
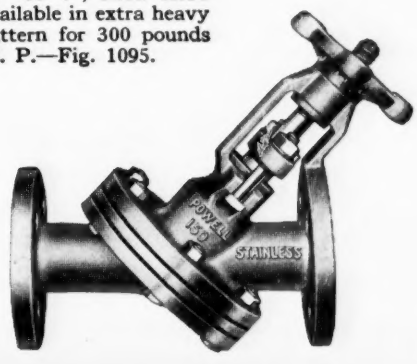


Fig. 2453—125-pound Stainless Steel O. S. & Y. Gate Valve, with flanged ends, outside screw rising stem threaded through bronze bushing in upper yoke arms, full flanged bolted bonnet and taper wedge solid disc. Shelf is provided on yoke for suspending gland out of stuffing box when renewing packing. Sizes, 2½" to 30", inclusive.

Fig. 1097—150-pound Stainless Steel Separable Body—Reversible Seat "Y" Valve that offers quick renewability or interchange of seat. Provides straightway flow area through valve body. Seat plate is reversible and renewable, having a machined seat surface on both faces. Lower half of body can be turned through an arc of 180° to make a 90° Angle Valve. Flanged ends only. Sizes, ½" to 4", incl. Also available in extra heavy pattern for 300 pounds W. P.—Fig. 1095.



POWELL VALVES

connected through semi-enclosed reduction gears to an electric motor. Pump constructions available are all-iron, bronze-fitted or all bronze. Capacity of each pump is 3 GPM at a discharge pressure of 100 psi. Pump speed is 570 RPM. Unit is designed to handle fuel oil, lube oil and similar liquids.

These units will later be available in larger capacities and high pressures for industrial applications where it is desirable to handle two different liquids through the same pumping unit simultaneously. Similar twin units are now available with clutches to permit either alternate or simultaneous operation of pumps.

Spray Strainers QC 400

Improvements in both design and construction are featured in two types of liquid strainers developed by Spraying Systems Company, Chicago.

For installations involving the use of several nozzles on a single feed line, the type TW offers unique advantages. Design of the strainer results in an extremely large open screen area in relation to the pipe area of the line so that it may easily handle the full capacity of a line supplying several nozzles. Consequently, the TW permits freer flow of the liquid and does not require cleaning as often as ordinary strainers. A blowout plug makes the TW easy to flush and clean without removal from the line.

The standard type TW is supplied with cast iron body and brass wire screen; all brass or all stainless steel construction is also available.

A choice of screen mesh is offered so that performance of the strainer may be directly related to size of nozzle orifice.

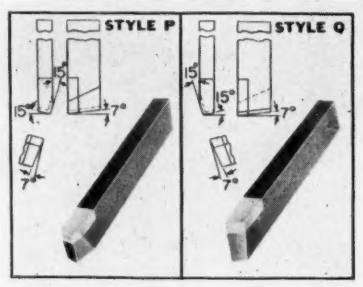
In the type Q line strainer, a highly effective strainer for single nozzle installation is offered. Maximum capacity of this strainer is one gallon per minute of water, brine, oil and liquids of similar viscosity.

The screen in this strainer is removable to facilitate cleaning, and like the TW, the type Q is available in several materials.

Stellite Tipped Tools QC 401

Two new styles of tipped tools especially designed for machining steel have been announced by Haynes Stellite Company. The new tools, designated as Style P and Style Q, consist of a cutting tip of Stellite 98M2 cobalt-base alloy brazed or butt-welded to a tough steel shank, with proper clearance and lead angles ground for turning steel.

Style P is a right-hand tool; Style Q is a left-hand tool. They are ground with a 15-deg. end cutting-edge angle, a 15-deg.



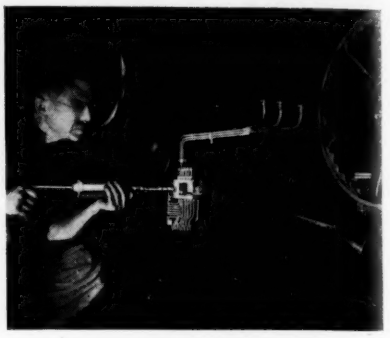
side cutting edge angle, a 7-deg. end relief angle, and a 7-deg. side relief angle. These tools are furnished with flat tops, so that users can grind their own side rake angle for each particular job. Five sizes of each tool are stocked, as follows:

⅝ x 1¼ x 8 in.
¾ x 1½ x 9 in.
1 x 1 x 7 in.
1 x 1¼ x 7 in.
1¼ x 1¼ x 7 in.

Lubricating System QC 402

Positive lubrication of all bearings on machine tools and similar equipment, regardless of location or condition of bearings, can be had through the improved "Multival" system made by the Farval corporation, according to a recent company statement. Oil or grease under pressure is delivered to the distributing blocks by means of a manual or power-operated portable gun which serves as a central pump.

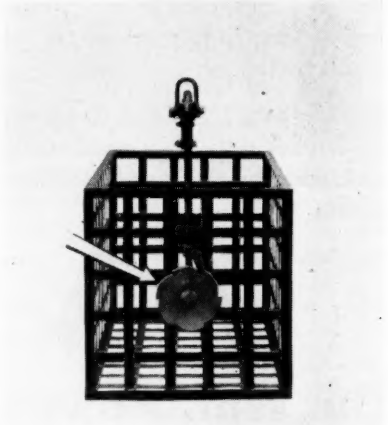
Complete multival equipment consists of the multiple valve blocks each serving 2 to 10 bearings, lubricant lines leading to individual points, and suitable fittings to accommodate practically any type of bearing connection. The systems can be readily installed by shop maintenance crews.



Each measuring valve can be individually adjusted to deliver the exact amount of lubricant required by the bearings it serves. A tell-tale on each valve piston indicates the positive delivery of lubricant to each bearing. With blocks mounted at accessible points on the machine the operator lubricates all bearings with complete safety while the equipment is in full operation.

Tippable Pickling Baskets QC 403

In pickling pots, pans, vessels, and many types of metal parts, it is necessary to drain the pickling acids from within the containers easily and quickly. Thus the openings and lattice work of the baskets should be large enough to permit rapid flow of the acids but, in addition, a ratchet that permits the basket to be tipped in a variety of positions gives aid in drainage.



The Youngstown Welding and Engineering Company developed for some of its baskets a new simplified ratchet which holds the basket in six different positions. It is positive and strong enough to be applied to practically any size equipment. The ratchet is pictured here on a Weldco Crate 60" long; 32" wide; 33" deep; weighs 304 pounds; and carries a 3,000 pound load.

CHEMICAL INDUSTRIES TECHNICAL DATA SERVICE

CHEMICAL INDUSTRIES, 522 Fifth Ave., New York 18, N. Y. (5-4)

Please send me more detailed information on the following new equipment.

QC 385	QC 389	QC 393	QC 397	QC 401
QC 386	QC 390	QC 394	QC 398	QC 402
QC 387	QC 391	QC 395	QC 399	QC 403
QC 388	QC 392	QC 396	QC 400	

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Typifying
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Service and Products

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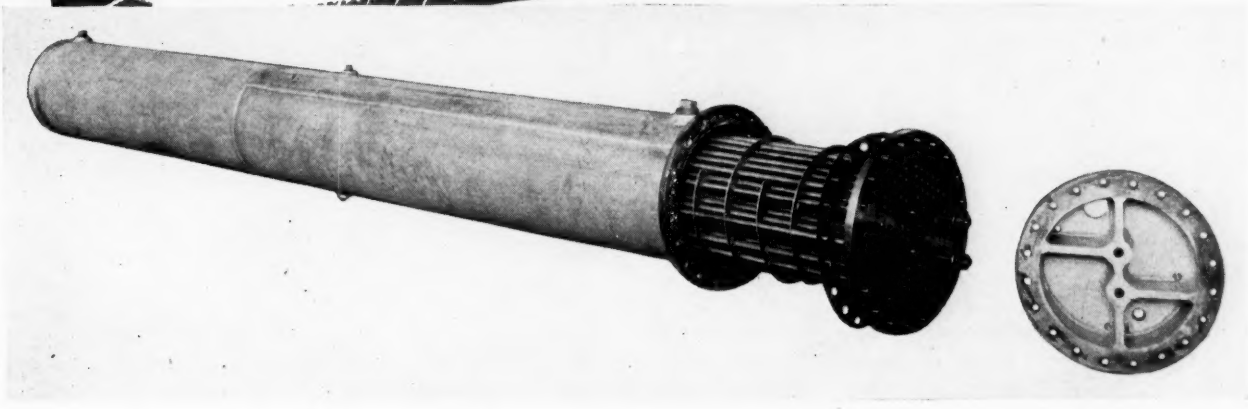
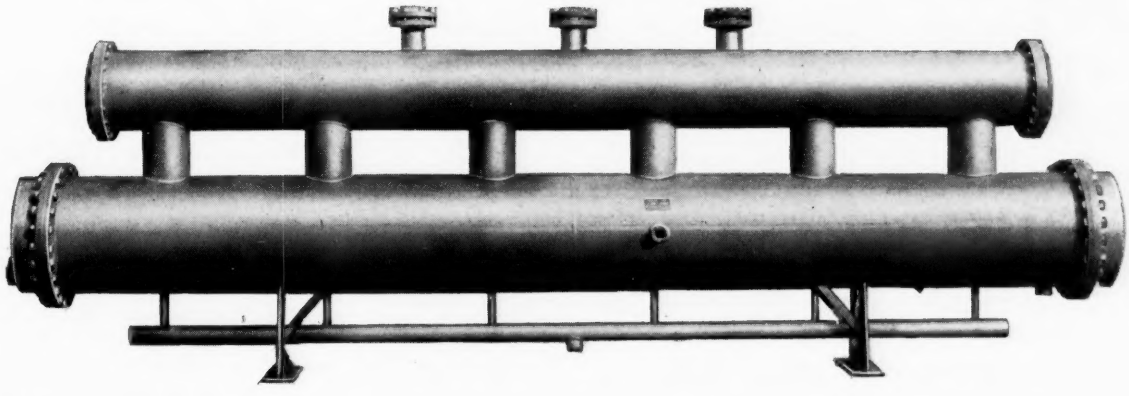
Heat Exchangers in Reverse!





Coolers, in effect, are heat exchangers in reverse. Instead of saving heat units which otherwise might go to waste, the cooler extracts the heat to get rid of it and thus restores the refrigerant to its operating temperature.

When in need of a "cooler" what is more logical than to call on "heat exchanger" specialists to design and construct the necessary unit to take the heat out of the refrigerant? In the field of heat exchangers, Patterson-Kelley engineers are recognized authorities on the subject. Calling on their broad knowledge of "heat transfer", they have designed many coolers for refrigerants.

EST. 1880

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PACKAGING & SHIPPING

by T. PAT CALLAHAN

War Production Board Review of Container Materials and Problems

THE War Production Board, recently made public the following review of the container supply, prepared by Harold Boeschenstien, acting director of WPB's Forest Products Bureau:

The problem of producing enough containers to take care of military and essential civilian needs is one of the most serious questions facing the country today. Overseas shipments will be greatly expanded in 1944 as the size of our Army overseas increases, and as we help to meet the subsistence needs of the countries we free from enemy occupations. These shipments mean more and more containers. To enormous war requirements, needs of our civilian population must be added—for few types of goods can reach the consumer without aid of a container, and current production of shipping containers is considerably less than total demand. The difficulty is sometimes shortage of factory facilities, more often shortage of raw materials, always shortage of manpower.

T. Pat Callahan

Steel

While the steel situation has eased somewhat, this statement is to a degree misleading insofar as metal containers are concerned, since the bottleneck in respect to steel for containers is primarily in rolling capacity. Military demands for flat strips and sheets will determine to what extent increased metal will be available for containers. In some cases, a slackening of demand from the Army is more than offset by increased requirements from the Navy, and vice versa, or by plate, strips and sheets having to be diverted to other essential uses. So far as steel drums are concerned, the rolling mill schedules are filled up to the end of June and there is no assurance that drum manufacturers will be able to get in the second half of the year, more steel than in the first half. In general, the high pressure cylinder industry has a large backlog of orders which will fill the capacity of the industry for some months ahead.

The demand for metal cans in 1944 is greatly increased, and arrangements have been made to provide steel for the manufacture of more cans this year. Fabricating capacity in the can industry is available for increased production. Whether or not food schedules are completely met depends largely on such factors as the size of crops and available labor supply to harvest them and to process the food. Increased demands come from the military for expanded overseas shipment. The order governing food cans is being somewhat relaxed, to provide more cans to pack enlarged civilian food quotas.

Glass

The problems in the glass container industry are shortages of labor and outer shipping containers rather than of raw materials or facilities for the containers themselves. Additional burdens are likely to be imposed on the glass container industry as shortages in other types of container continue. While more glass containers will be produced in 1944 than in 1943 (estimated 95,500,000 gross of all types as compared with 93,600,000 gross) the industry is approximately 25 per cent over-sold at present because of unusually heavy immediate requirements for products destined for off-shore shipment. It is anticipated that containers for home canning will be available in larger amounts than in 1943. Simplification and standardization of all types of glass containers has resulted in increased production.

Textiles

The textile bag situation is tight at the present time and the industry as a whole is from 30 to 60 days behind in deliveries. Increasing manpower shortage is likely to further curtail available skilled and unskilled labor already short.

It was estimated that the inventories of cotton goods in the textile bag industry were down 27 per cent on March 31, 1944, as compared with the stock held in inventory at the end of 1943. Cotton sheetings, the largest item used for textile bags, are in the tightest situation. The industry reports that it is 63,000,000 yards short or requirements for the second quarter of 1944 and that inventories are nearly 30 per cent short from a normal 60-day inventory allowed. Cotton goods allotments to the bag industry as requested by the War Food Administration amount to 570,000,000 yards for the first half of 1944, a reduction of 152,000,000 yards from goods estimated as consumed by the bag industry in the first half of 1943.

Burlap stocks as of March 31, 1944, were reported by the industry to be 10,000,000 yards short of the 60-day inventory allowed. However, allotments made for the first six months of this year amount to approximately 330,000,000 yards and are about equal to requirements. Future receipts of burlap depend on conditions in India.

Wood and Paper

The fibre drum industry has been greatly expanded. In 1942, about 6,000,000 fibre drums were produced, which were used mainly for packaging dry products. To relieve the shortage of steel drums, about 12,000,000 fibre drums were produced in 1943, and, if enough fibre is available, approximately 16 000,000 fibre drums are expected to be produced in 1944. Most of these drums are now used to ship food, chemicals and petroleum products.

Paper drinking cups and food containers, important to the functioning of our war economy, are seriously short. Since October, 1943, practically the entire production of hot-drink cups and paper food containers has been channeled to the Army and Navy to meet military operational needs, and to war plants for in-plant restaurants and other employee use. A similar situation is developing with respect to flat bottom cold-drink cups.

The darkest outlook is for wood and paper shipping containers. Basically these containers are critical because of the shortage of manpower in the woods to produce the needed raw material. Since 1941, there has been a decline in lumber production and a sharp increase in rate of consumption. The largest rise in consumption has been for container and shipping uses—boxing, crating and dunnage. In 1941, the estimated overall production of lumber was 36,540,000,000 board feet, of which 5,500,000,000 went into boxing, crating and dunnage. In 1942, total production amounted to 36,300,000,000 board feet, but the quantity of it for boxing, crating and dunnage jumped to 9,546,000,000 board feet. In 1943 estimated lumber production figure is 34,630,000,000 board feet and of this 16,500,000,000 board feet was required for crating and dunnage. First quarter lumber stocks for this year, approximately 7,000,000,000 board feet,

AMOCO MOTOR OIL
Goes to the front in these special containers.

Service Station at the front

No computing gas pumps . . . no "Clean Rest Rooms" . . . and if you're talking about "free air" you mean a sky swept free from enemy airplanes.

But that's the sort of wartime service station to which Amoco Motor Oil is being delivered today . . . delivered by the efforts of the Navy and the Coast Guard to help maintain the Army's motorized equipment.

And when Amoco Motor Oil travels to the front . . . it travels in specially designed Crown kits . . . about five-gallon steel containers that protect the oil from sea water and sand . . . from rough handling under battlefront conditions.

Supplying those containers to the American Oil Company is one more of Crown Can's wartime jobs . . . one more way an organization that so faithfully served America's peacetime needs is pitching in to help speed victory!

CROWN CAN COMPANY, New York • Philadelphia
Division of Crown Cork and Seal Company, Baltimore, Md.

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are contrasted with much more than twice that amount for the first quarter of 1942. The 1944 figure may be considered generally an irreducible working minimum and on certain species and grades there is no inventory cushion. Favorable weather in the Pacific Northwest helped production during the first quarter, but in the South, weather conditions were generally unfavorable.

As to paperboard containers, the greatest problem is again one of raw materials, pulpwood production and waste paper collection to provide the necessary pulp for paperboard mills. Inventories of raw material on hand in the box plants are down substantially from the estimated 360,000 tons of January 1, 1939, to 257,000 tons on hand January 1, 1944. The production of paperboard for containers so far this year is running at about the same rate as last year, but the demand for this type of container has greatly increased for the same reasons that requirements for all types of containers have grown—military added to civilian need.

Furthermore, overseas shipments both in wooden and fibreboard containers require much heavier and sturdier packing than domestic shipments in order to assure the arrival, in usable condition, of all types of ammunition, material than in 1943 because of increase of these sturdier types for shipments abroad. In most cases, it is out of the question to return used containers from overseas either for further use or salvage.

A great deal depends on the success of the Southern pulpwood cutting campaign since most of the woodpulp used in making fibreboard for containers comes from the South. Of equal importance will be the success of wastepaper campaigns, as wastepaper pulp is a necessary ingredient in the manufacture of most types of paperboard for containers.

It is obvious that the maximum reuse should be made of all types of shipping containers. The Containers Division of the War Production Board is at present sponsoring a Container Re-Use Program and giving it national publicity. Meetings have been held throughout the country and wide publicity has been obtained from trade associations, trade publications and through many other channels. The response indicates that a substantial contribution will be made to the solution of the container problem through the maximum reuse of all types of shipping containers, wherever possible, and the practice of economy and conservation in their design and original use.

The American people should be fully aware of the seriousness of the container situation. Commodities are of little use if containers are not available to move them from manufacturer to consumer.

Amendments and Additions to ICC Regulations

From the amendment and additions to the "Regulations for the Transportation of Explosives and Other Dangerous Articles" which were promulgated by the Interstate Commerce Commission on the 29th day of March, 1944, we quote the following which appears to affect the packing and shipping of various chemicals.

The complete order as of this date from which these amendments and regulations are taken is on file at the Office of the Interstate Commerce Commission at Washington, D. C.

Section 29(a) was amended to include removable head containers so that said section now reads:

"29(a) Empty cylinders, barrels, kegs, or drums, previously used for the shipment of any dangerous article, as defined herein, must have all openings including removable heads, filling and vent holes properly closed before being offered for transportation."

This is a very necessary addition in order to promote safety in transportation of empty containers which must have all openings securely closed.

Section 110, Paragraph (b)(4) has been amended by the addition of the following note to this paragraph: This applies to inflammable liquids having flash points above 20 to 80° F.

"NOTE. Because of the present emergency and until further order of the Commission, used metal drums in good condition, manufactured prior to May 1, 1943, having welded side seams, openings not over 2.3 inches in diameter, bodies and heads of 18 gage minimum thickness, and minimum rated capacity of 55 gallons may be reused, if retested by owner or user in the manner prescribed in Par. 14 of Specifications 17E, and approved for service by the Bureau of Explosives. Each drum must be embossed or stamped on one end (1) with manufacturer's name, or with an identification symbol or trademark which must have been registered with the Consolidated Freight Classification Committee, and (2) with the U. S. Standard gage of the metal, the capacity of the container, and the year of manufacture (these may be abbreviated and must appear in the order specified, for example, 18-55-43). Each drum must be adequately closed before shipment to prevent leakage, gaskets being required, and must be stamped with the words "AUTHORIZED FOR REUSE BY BUREAU OF EXPLOSIVES." Applications for permission for reuse should be made to the Bureau of Explosives, 30 Vesey Street, New York City."

Section 264, Paragraph (o)(2) has been amended as follows:

"(o)(2) Spec. 3, 3A, 3B, 3C, 3E, 4, 4A, 25, or 38, also 4B or 4C if not brazed. Cylinders. Filling density must not exceed 85 per cent of the pounds water weight capacity of the cylinder."

This amendment limits the filling density of cylinders of Hydrofluoric Acid Anhydrous.

Section 268, Paragraph (f) is amended by the following additional note:

"Because of the present emergency and until further order of the Commission, Spec. 42B drums having not less than 99.7 per cent aluminum content are authorized for fuming acid having specific gravity of 1.59 to 1.65 and containing not more than 0.1 per cent of hydrochloric acid or more than one per cent of sulfuric acid."

An Appeal for Empty Carboys

The most common container used for the shipment of acids to a large percentage of acid users is the 12 and 13-gallon carboy, and without this container the delivery of acid to a great number would be definitely eliminated.

There is a tendency on the part of many users of acid to accumulate these carboys when empty and become negligent concerning their return to the supplier. This is a very serious situation which exists at the present time. The ability of manufacturers to build new carboys and repair old ones is being curtailed because of a very serious shortage of materials from which the carboys are made. In some sections of the country at the present time, it is impossible to procure satisfactory lumber from which carboy boxes are made, and if manufacture is curtailed, it is obvious that the supplier must look to a better return of existing carboys in order to continue supplying his customers.

We strongly urge that this matter be given very serious consideration and that all charged with the return of empty carboys take it upon themselves to personally see that carboys are returned to the original shipper as soon as empty. It is a reasonable statement to make that if all existing empty carboys in the hands of customers are returned to the suppliers, there will be no shortage of carboys, as there are enough carboys made and in service at the present time to take care of our normal domestic business.

Barrel Manual

A new booklet entitled "The Wooden Barrel Manual" has been issued by the Associated Cooperage Industries of America, Inc., and can be procured by writing to this Association, 408 Olive Street, St. Louis 2, Missouri.

This manual contains pertinent information concerning the manufacture, specifications and uses to which both slack and tight barrels are subjected.

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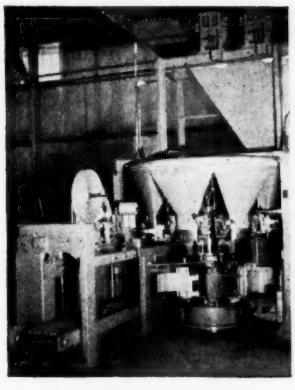
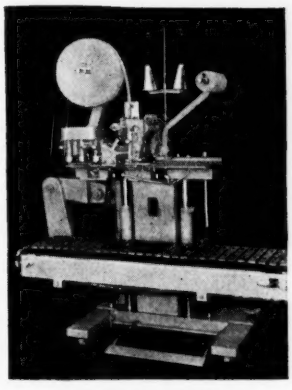


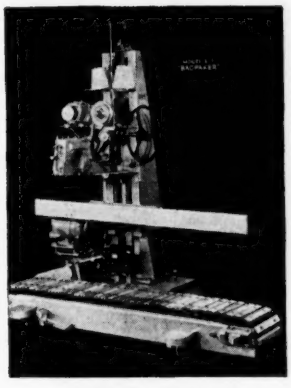
MODEL "A"

Performs the full packaging cycle, automatically weighing, filling, closing and sealing 900 one hundred pound bags per hour with only one operator.



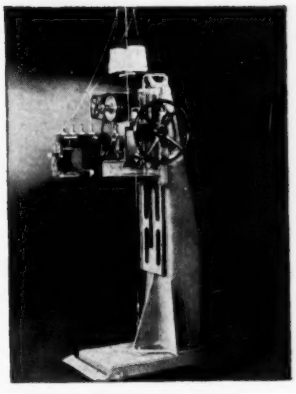
MODEL "D-A"

Automatically sews and seals at the rate of 8 bags per minute with one operator. Can be set right in your present packing line.



MODEL "E-1"

Automatically sews. Has been operated as high as 20 bags per minute. Adaptable to your existing lay-out.



MODEL "F-1"

Same as "E-1," except designed to be set up over existing conveyors.

ALL of these Bagpakers make the nationally known Cushion Stitch closure. The models "A" and "D-A" automatically apply either plain or moisture proof kraft tape over the stitching — thus effectually sealing the closure against sifting, or moisture-vapor penetration, or loss. Models "E-1" and "F-1" apply only the cushion stitch and are for use where the sealing tape is not required. Each is equipped with a specially designed sewing head which lays a thick soft cord across the bag end and cross-stitches around without going through it. This cord forms a cushion or shock absorber that takes up the strain of handling or dropping the bag, and prevents the stitching from pulling through the bag walls. The closure is in fact the strongest part of the bag.

We are prepared to give your inquiry immediate attention.

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PLANT OPERATIONS NOTEBOOK

by W. F. SCHAPHORST

Heat Losses in Uninsulated Pipe

Here is a chart that will assist in determining whether or not it will pay you to insulate your heat carrying piping.

To show how the chart is applied, let us take the following typical example: The piping we are questioning has an area of 100 sq. ft. and it is located in a room whose temperature is 70 deg. F. The temperature of the steam in the pipe is 270 deg. F. Therefore the "temperature difference," column D, is 200 degrees. The steam is in the piping for 200 hours. The cost of the coal is $3.50 per ton of 2000 pounds. The heat value of the coal, column B, is 12,000 B.t.u. per pound. The efficiency of the boiler, column E, is 60 per cent. What is the dollars value of the heat lost through the uncovered or uninsulated piping during the 200 hours?

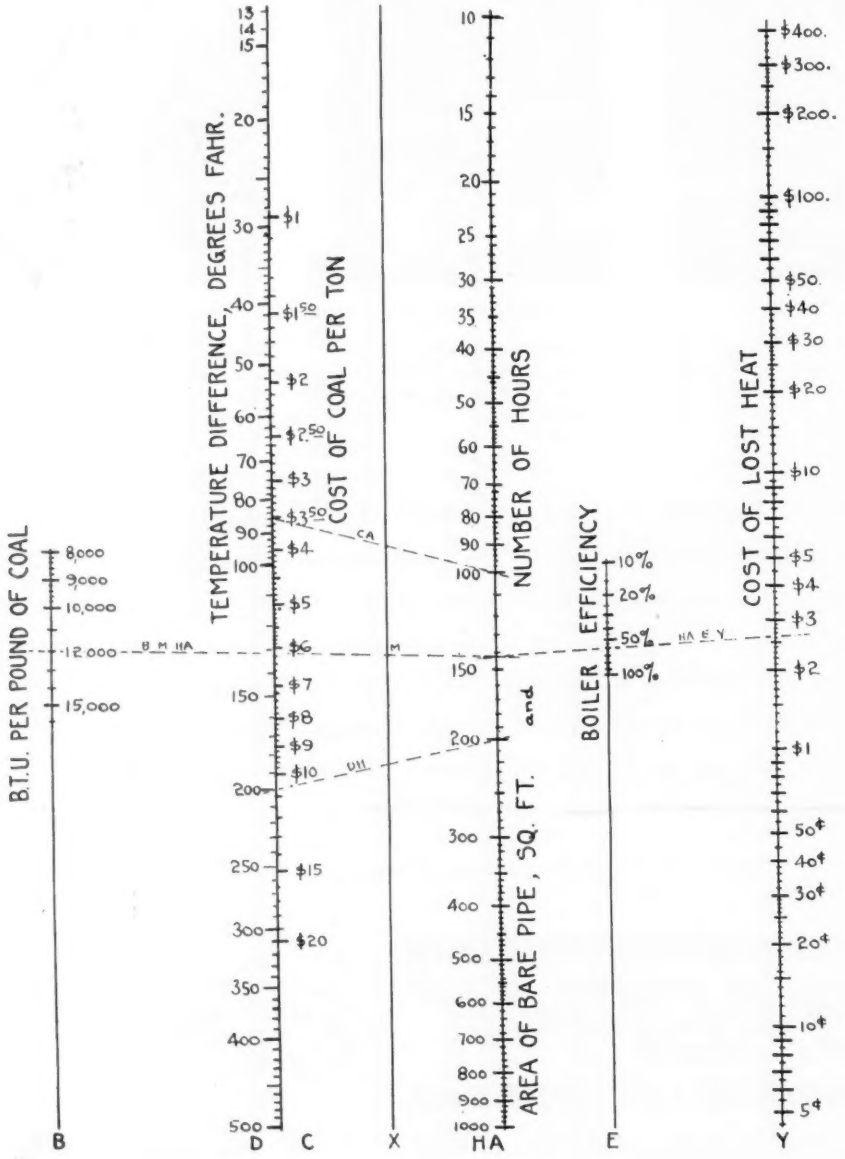
First run a line through the cost of the coal C, column C, and the area of the pipe A, column A, as indicated by the dotted line marked CA which connects the $3.50 and the 100.

Then run a line through the "temperature difference" D, column D, and the number of hours H, column H, as indicated by the dotted line DH connecting the 200 and the 200.

Now find the point M in column X which is the mid-point between the intersection of CA and DH with column X. You can easily find the mid-point by means of a pair of dividers, or, lay a strip of paper between the two points and fold it carefully. The mid-point is at the "crease" when accurately folded. There are many other ways in which the exact mid-point can be found.

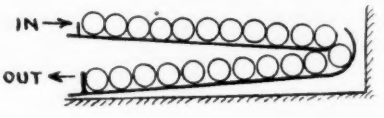
Next run a straight line through the 12,000, column B, and the mid-point M in column X and locate the intersection with column HA.

And finally, from that point of intersection in column HA run through the boiler efficiency 60% in column E and the intersection with column Y gives the answer as $2.64 which is the cost of the heat loss during the 200 hours.



How to Keep Stock from Becoming Stale

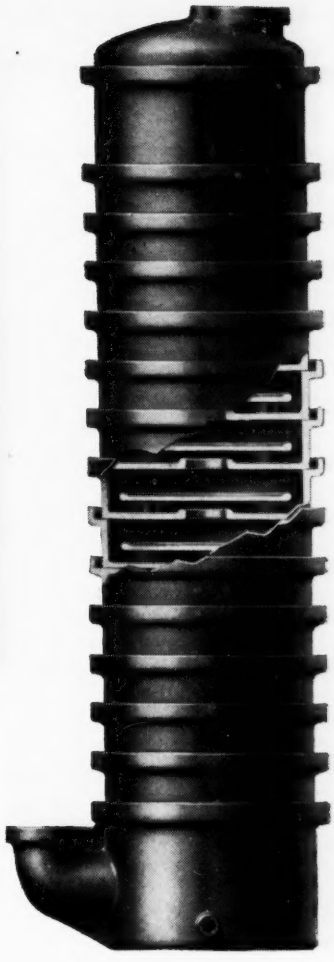
Here is a method followed by a plant operator who wants to keep his stock of supplies as "fresh" as practicable. The sketch explains the idea so clearly that words are scarcely necessary. Arrange two inclined planes is indicated, so that when a cylindrical parcel or package (a barrel, drum, or tube of oil for example) is removed from the bottom at the point marked "out" the remaining parcels will advance by one diameter leaving space at the top where the newest package is inserted—at the point marked "in."



In this way the "oldest" package is always removed and a fresh stock maintained. Each package awaits its turn. There is no possibility that a package will remain indefinitely in the plant without being used.

The longer the length of inclined planes, the better, where considerable storage is required, because the capacity of the device is directly proportional to the length of the inclines. Steepness of the inclined planes is not essential. If the packages do not roll automatically upon removal of the lowest package, give the top package a push. The same principle can be applied to packages of various shapes except that the packages may be caused to slide and not roll. Or, if practicable, place the stock in cylindrical containers suitable in size, using the same containers over and over. Also, by making it a point always to keep this device full, the possibility of running out of stock becomes remote.

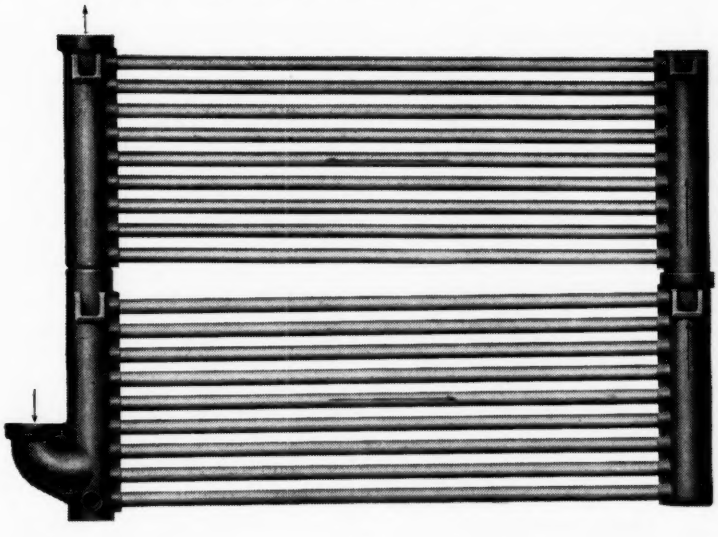
FOR THAT TOUGH CORROSION PROBLEM SPECIFY GENERAL CERAMICS COMPANY CHEMICAL STONEWARE OR PORCELAIN



GENERAL CERAMICS COMPANY STONEWARE CASCADE TOWERS ➡

Available in sizes up to 48" diameter

The tower illustrated was designed specifically for drying chlorine and has been adapted as standard equipment for this purpose by the Chemical Warfare Service and the leading chlorine manufacturers on the American continent.



GENERAL CERAMICS COMPANY STONEWARE TUBULAR GAS ⬅ COOLER

The thin walled tubes are furnished in lengths up to 10 feet and are made of a special ceramic body having a relatively high thermal conductivity. Any number of tubes can be arranged for series or parallel flow as desired.

We are prepared to offer recommendations for this service or other possible applications of the equipment.

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LABORATORY NOTEBOOK

Polarographic Apparatus

The rapid development of polarographic technique has now made available analytical methods in which the actual time required for the process is only a few minutes. Removing oxygen from solutions to be polarographed however still consumes considerable time, particularly at very low concentrations and at high galvanometer sensitivities, since in these cases even a minute proportion of this gas will obscure small steps.

Apparatus both for the rapid removal of oxygen and for the electrolysis cell to which the oxygen remover is attached are described by E. Weinig in *Chemische Fabrik*.

The apparatus in Fig. 1 allows the complete removal of oxygen from a volume of 2–3 ml. in approximately half-a-minute.

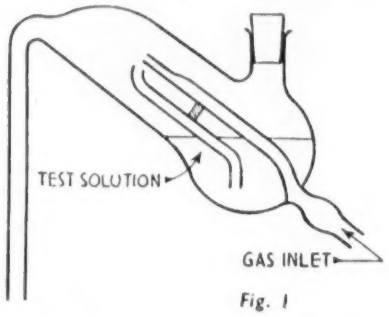


Fig. 1

The apparatus is in the form of an atomiser and the stream of purified nitrogen or hydrogen comes into such intimate contact with the mist particles that instantaneous saturation with the gas and removal of oxygen results. The mist is projected against the sides of the vessel, condenses in the delivery-tube, and runs into the electrolysis-cell. No detectable increase in concentration occurs through evaporation of the solvent.

A form of electrolysis-cell which is cheap, easy to make and to clean, is illustrated in Fig. 2.

The normal polarographic cells are either difficult to clean or necessitate the use of considerable quantities of mercury. The cell described here consists of two parts. The first is a vessel containing a layer of mercury to which connection is made by an external terminal. The "contact-tube" in which the test-solution is electrolysed consists of a short closed tube, through the bottom of which is sealed a length of platinum wire, which projects 2 mm. inside and outside. This wire completes the connection between the internal and external pools of mercury.

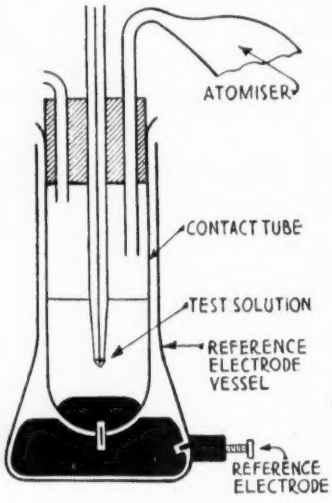


Fig. 2

The upper end of the tube is closed by a rubber-bung carrying the delivery tube from the atomiser, the dropping mercury cathode and an exit tube for the nitrogen. When the tip of the platinum wire is covered by mercury dropping from the capillary, the cell is ready for use. For analysis of volumes of the order of 1 ml. the tube may be constricted at its lower end. This form of cell has the marked advantage of requiring very little mercury and of preventing the handling of this poisonous liquid.

Anion Analysis

From a paper presented before the Chinese Chemical Society, July, 1943, by Ting-Ping Chao of National Central University, Chungking, China, a note is taken on making of the "prepared solution" in anion analysis.

In this analysis the so-called "prepared solution" employed is made by boiling the sample with a solution of sodium carbonate. However, as demonstrated by A. A. Noyes, the hypochloride iron decomposes into chloride and chlorate iron during this treatment. Since the speed of oxidation-reduction reactions increases with the temperature, not only does the hypochlorite ion decompose, but also anions having strong oxidizing or reducing power may react in the boiling sodium carbonate solution. Because of this, some anions may be destroyed while others may be produced. To avoid errors of this kind, the following method is suggested for the preparation of the sodium carbonate extract.

Place 0.5 g. of the sample in a small beaker and add 10 ml. of a cooled solution of sodium carbonate. Stir vigorously with a stirring rod for 10 minutes, and after it has settled decant the clear supernatant solution into another beaker. Add another 10 ml. of cooled sodium carbonate solution to the residue and repeat the process. Add still another 10 ml. of sodium carbonate solution to the residue, heat the mixture to boiling, and continue to boil for 5 minutes. While the solution is still hot, filter it into a small beaker. After the filtrate has cooled, mix it with the supernatant liquid already obtained, and use the combined solution for the analysis of anions.

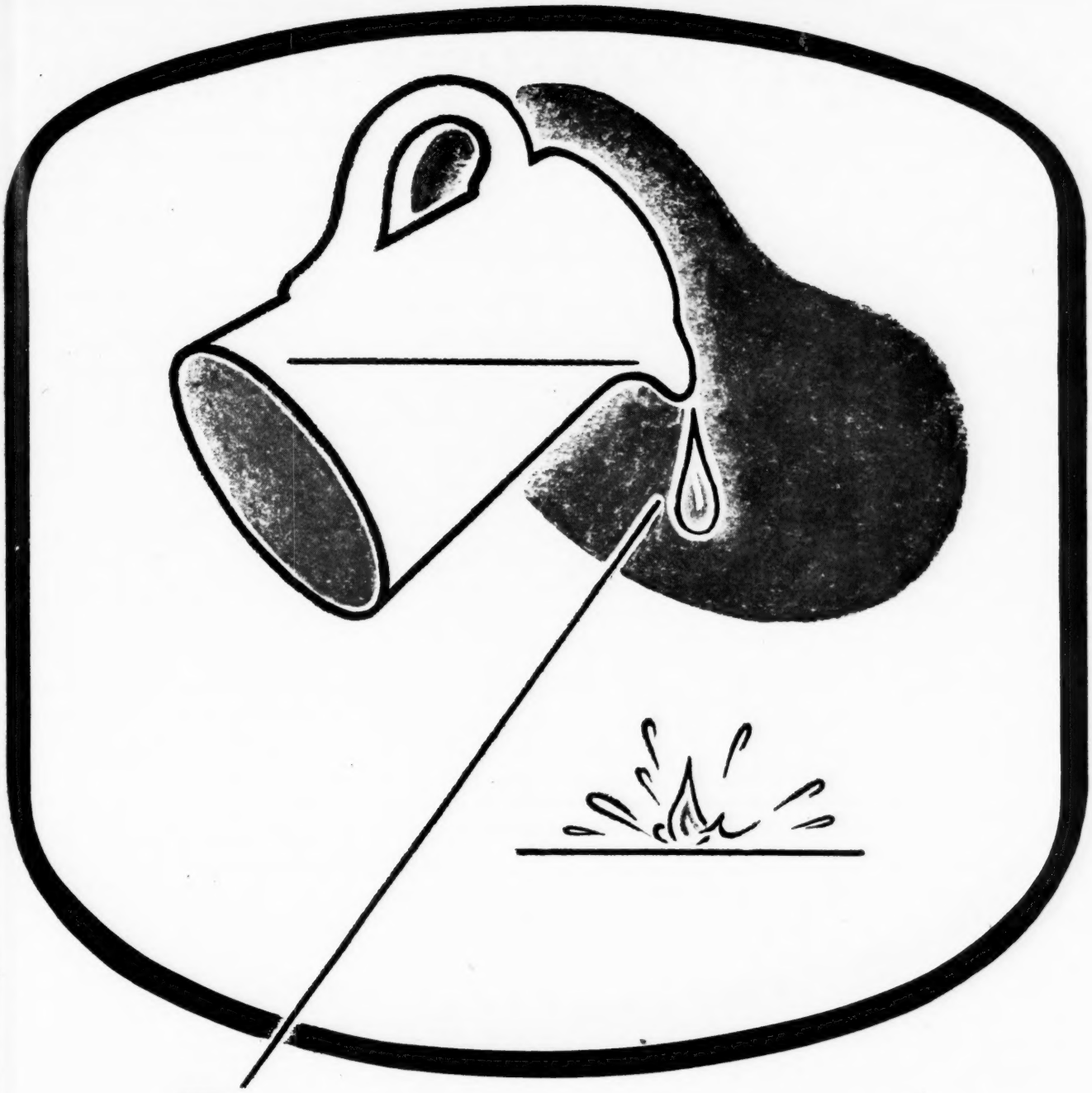
Four-Point Gas Analyser

A new gas analyser built for installation in one of the nation's large metallurgical plants determines the percentages of O_2, CO_2, CO and H_2 simultaneously, and continuously records the amounts on a single chart and of interest, therefore, to chemists, metallurgists, oil refiners and other engineer executives. Chemicals, fragile glassware and moving parts in the analyses unit are eliminated. The instrument is useful in processes wherever knowledge of the amounts of the gases mentioned is required. Its use enables close control in chemical processes, oil refining and in the operation of various types of kilns, inert gas producers, furnaces in the metallurgical industry and other combustion processes. The complete analyser operates directly from the alternating current supply line. The recorder may be located at any required distance from the sampling point and the instrument can be furnished with contacts for operating warning signals or to actuate various control circuits.

In theory the instrument accomplishes analysis by direct comparison of thermal-conductivity of the sample with that of a reference gas or by comparison of thermal-conductivity of the sample before and after chemical absorption or combustion. This principle of operation permits units to be assembled to meet many special problems. In the operation of a typical unit a continuous sample of the gas is drawn into the analyser by means of a water bubble-aspirator.

In all applications the results are recorded directly without any corrections or interpolation of any kind. The upkeep required is of a routine nature and does not require the services of a technically trained man. A continuous record of the analysis is provided on a 10-inch strip chart, and the four different registrations (one for each gas) are shown by different colors and numbers on the chart.

The 4-point Gas Analyser is a development of the Cambridge Instrument Company, Inc.



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INDUSTRY'S BOOKSHELF

Legal Guide

PATENT LAW, by *C. H. Biesterfield.* J. Wiley and Sons, Inc., N. Y., 1943, $2.75. Reviewed by *D. L. Conner*, Legal Department, The Dow Chemical Co.

STUDENTS of patent law, chemists, engineers, researchers, patent lawyers, as well as others having need for a ready reference to substantiate patent law, will find in Mr. Biesterfield's book that this complex subject is capable of simple treatment.

Obviously, the author has not intended that his work be an exhaustive treatment of patent law, instead as the title indicates, the book is designed to meet the needs of chemists, engineers and students, and this it admirably does in a terse and readily understandable style.

In the short space of approximately 200 pages of text and cases devoted to this subject the author has shown a marked ability to lift the veil of confusion from this normally considered difficult to understand subject. This is done by treating the more important principles and phases of the subject under selected headings, and individually explaining each with a minimum of reference to collateral issues. The result is that each topic is developed as a separate unit in the form of a thumb-nail sketch, reciting the basic and practical considerations necessary for a workable understanding of the subject.

Despite the brevity of this book and the ease with which the subject is presented, it can not be termed elemental, for it amply covers the practical phases of patent law and is replete with timely citations to adjudicated patents, patent statutes, and rules of procedure before the patent office. These citations are referred to at appropriate points to authenticate and illustrate the text. And in this connection there are employed but a minimum of reference to exceptions to the rule, thus obviating any confusion in the mind of the reader caused by presenting a host of apparently unreconcilable and conflicting decisions and authorities.

The author clearly distinguishes between patents and monopolies, a distinction which in the past has not been at all times properly appreciated, or understood by all parties concerned with this subject.

Patentable invention, and what constitutes the same, usually a difficult subject to explain, is treated in an exceptionally comprehensible manner. In this connection it is of interest to note that the author fully appreciates the current trend of our courts to require a higher degree of invention before sustaining the validity of a patent.

The sections of this book which treat the subject of chemical patent claims, patent interferences, reissues and disclaimers, merit individual notice.

The book includes a simple, but workable index; a table of the cases cited; and a bibliography.

High Octane Fuel

AVIATION GASOLINE MANUFACTURE by *M. Van Winkle.* McGraw-Hill Book Co., N. Y., 1944; 275 pp., $3.00. Reviewed by *G. G. Oberfell*, Phillips Petroleum Co.

THIS BOOK is one of the Mineral Industries Series of the Pennsylvania State College. Its purpose, as stated by the author in the preface, is to summarize the available information concerning the manufacture of aviation gasoline in such a form that it will serve as a reference for persons interested in this field of refining, and to develop a fundamental and logical discussion of aviation gasoline manufacture that will serve as a textbook for students and others. Although detailed information for many of the processes described could not be published, this purpose has been well fulfilled.

The initial fourth of the book deals with such orienting subject matter as the history and development of aviation fuel, the development of aviation fuel from 1930 to 1942, the specifications and test methods for aviation fuels, and the hydrocarbons present in aviation fuel and in aviation fuel manufacture. The middle half, or slightly more, of the book is devoted to the production of aviation fuel base stocks, the manufacture of high-antiknock hydrocarbons and the production of finished aviation gasolines. The remainder of the book describes special aviation fuels and aviation fuels components, the performance of aviation gasolines, and the test methods for evaluation of aviation fuels.

The book reflects a great deal of painstaking care and effort expended by the author to impart to the reader a clear understanding of the subject matter. Only the highly critical reader will observe such minor and unimportant imperfections as a rather loose interpretation of the combining form "iso" (e.g., "The addition of a side chain to a n-olefin makes it an isoolefin"), a slight divergence from the nomenclature of olefins preferred today by most American chemists, and a few trifling typographical errors.

As this book makes a useful technological contribution in bringing together the many and various pieces of pertinent information published during the past quarter century, it will obviously fulfill its author's hope that it will serve satisfactorily as a summary of existing publishable information on aviation gasoline.

New Handbook Edition

HANDBOOK OF CHEMISTRY, by *N. A. Lange*, Fifth edition. Handbook Publishers, Inc., Sandusky, O., 1944, 2090 pp., $6.00.

THIS consistently reliable handbook has come out in its fifth edition with increased clarity of presentation of its data, additions to previously included information, and with latest developments in various branches of technology.

Highlights of the volume include a newly revised physical constants table including thousands more compounds than the same table in previous editions, a bibliography included with each subject treated, and Beilstein references to all organic compounds. The legible type, alphabetical listings, and the complete index facilitate finding of data. The size of the book, the method of binding and the texture of the pages lend themselves to convenient handling.

Lange's Handbook has the reputation of being necessary equipment for anyone needing accurate, pertinent information arranged in orderly and easily accessible fashion in one volume. This latest edition with its improvements should be well received.

Standard Reference

ORGANIC SYNTHESES, Vol. 22, L. I. Smith, editor. John Wiley & Sons, Inc., N. Y.; 1942. 114 pp., $1.75.

SYNTHESES included are: Acetobromoglucose; 9-aminoacridine; 2-amino-*p*-cymene; *a*-aminodiethylacetic acid; 2-amino-6-methylbenzothiazole; 3-amino-2-naphthoic acid; *dl-a*-aminophenylacetic acid; *dl-beta*-amino-*beta*-phenylproprionic acid; azobenzene; *o*-carbonxyphenylacetonitrile; 4,4'-diaminodiphenylsulfone; 2,6-dimethoxybenzonitrile; 2,3-dimethylanthraquinone; 2,3-dimethylbutadiene-1,3; 2,5-dinitrobenzoic acid; 3,5-dinitrobenzoic acid; diphenylacetylene; diphenyliodonium iodide; *beta*-gentiobiose octaacetate; *beta-d*-glucose-1,2,3,4,-tetraacetate; guanidoacetic acid; homophthalic acid; 2-hydroxy-1-naphthaldehyde; imidazole; iodobenzene dichloride; iodosobenzene; iodoxybenzene; linoleic acid; linolenic acid; *d*-mannose; *n*-methyl-3,4-dihydroxyphenylalanine; 2-methylindole; phenyl azide; 2-phenylindole.

BOOKLETS & CATALOGS

Chemicals

A633. ALUMINUM. An interesting booklet on "Imagineering" discusses the economic advantages of aluminum on 12 important points, among them, corrosion resistance, electrical and heat conductivity, workability, appearance, and re-use value. The layout is attractive and highly illustrative. Aluminum Co. of America.

A634. BENZOATES. A treatise on the federal and state laws governing the use of benzoates in food products, the preserving action of benzoate, and other technical data for food processors and beverage manufacturers has been published in revised edition. Seydel Chemical Co.

A635. CHEMICAL PRICE LIST on essential oils, aromatics, certified colors, and flavoring materials is now available. Magnus, Mabee & Reynard, Inc.

A636. DERMATITIS. A small folder describes the specific uses of four different products for helping eliminate skin troubles in the plant. Jones Medical Laboratories, Inc.

A637. GEON. A colorful folder presents complete information on the properties and applications of the polyvinyl resins and plastics called geon with illustrations of its manufacture and uses. One page is devoted to an outline of characteristics of the four geon resins, with a table of properties included. Geon plastics, with the range of characteristics described, is the subject of another page. The list of geon applications includes electrical service, extruded products, gaskets and packing, as protective coatings, for coated fabrics and papers, calendered and cast sheets and films. B. F. Goodrich Co.

A638. HARD RUBBER, its qualities, applications, limitations, resistance to chemicals, and machining properties are discussed in catalog section 9405. Tables list types which the company makes, and dimensions and weights of sheets, rods and tubing are included. B. F. Goodrich Co.

A639. INSECTICIDES. A small pamphlet catalog contains descriptions and percentage composition of all ingredients for both arsenical and non-arsenical insecticides, fungicides, and weed killers of various types. Chipman Chemical Co.

A640. PLASTACELE. A well-illustrated handbook covers completely the properties, applications, and fabricating information of plastacele, the cellulose acetate plastic manufactured in sheets or molding powders, and includes diagrams, tables, and clear explanations of operations. E. I. du Pont de Nemours & Co., Inc.

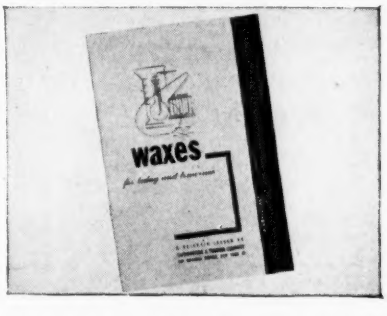
A641. SYNTHETIC MENTHOL. All the major scientific literature dealing with the toxicity and the pharmacological value of menthol and its isomers has been collected as nearly as possible in its original form in a paperbound book. Data from German, Swedish, Japanese, as well as American sources is included. Givaudan-Delawanna, Inc.

A642. SYNTHETIC OPTICAL CRYSTALS, important in the rapid development of infra-red spectroscopy, are described in a well-illustrated booklet which explains and includes photographs of various types of crystals and also includes diagrams of their refractive indices and absorption coefficients, and a pictorial story of the laboratory procedure of making a synthetic crystal from raw materials to the finished product. Harshaw Laboratories.

A643. SYNTHETICS. A clear colorfully illustrated booklet to give a better understanding of the close inter-relation of the kindred synthetic materials, chemicals, plastics, textiles, has been prepared by the Celanese Corporation of America.

A644. SULFUR. The use of sulfur in the control of truck crop and cane fruit insects and diseases is the subject of an 85-page revised edition offering complete and authentic coverage. An extensive bibliography and index is included. Texas Gulf Sulphur Co.

A645. WAXES. To provide a ready reference to waxes, their substitutes, replacements, and extenders for manufacturers faced with shortages of many mineral and vegetable waxes a new technical



bulletin has been issued. Thirty-six different kinds of waxes are listed. Distributing and Trading Co.

Equipment—Methods

F82. AUTOMATIC TIME CONTROLS. A 4-page folder describes and illustrates the operating principle and types of automatic time controls for use in metalworking, chemical process, petroleum refinery and food processing industries. Automatic Temperature Control Co., Inc.

F83. CHAIN BELT DRIVES. Bulletin No. 435 has been published giving information on the wartime maintenance, lubrication and repair of chain belt drives in a clear readable style with illustrative diagrams and cartoons. Chain Belt Co.

F84. CHEMICAL PROCESS EQUIPMENT. An informative catalog No. 1957 illustrates and discusses briefly and clearly all phases of the development of chemical process equipment from test tube experimentation to the commercial plant with special emphasis on pilot plant process equipment. Blaw-Knox Co.

F85. CHARTS. Bulletin 1-44ER illustrates and describes charts, rules, scales, and discs for the engineer. Universal Engraving and Colorplate Co.

F86. CRATING INSTRUCTIONS. Instruction charts, designed to save time in the shipping room, show the simple steps necessary to assemble and close all types of general wirebound and crates. Information is clearly presented and the charts are packed full of useful photographs. General Box Co.

F87. ELECTRIC TRUCKS. Helpful information for plants or warehouses on material handling with power trucks and the means for selection of the right equipment for any set of requirements is contained in catalog No. 52. Special models for unusual handling operations have also been included. Baker Raulang Co.

F88. ELECTRONIC TUBES. A new quick-selection chart of electronic tubes for industry is contained in a 4-page bulletin (ET-12). General Electric Co.

F89. ENGINEERING INSTRUMENTS. A catalog of specifications and prices of engineers' products for use on all optical comparators, measuring projectors, micro projectors, and shadowgraphs is available. Universal Engraving and Colorplate Co.

F90. FLUID PROPORTIONING. Bulletin 1100 has been published as a practical handbook showing specific applications of equipment for continuous automatic proportioning of fluids. Proportioneers, Inc.

F91. HAULAGE VEHICLES. A vest pocket catalog describes, illustrates and gives uses for many types of heavy industrial haulage vehicles. Clark Tructractor.

F92. HEAT TREATING. Production

data on the interrupted quench in salt, packaging steel for overseas, forging and heat treating gun tubes is presented in booklet No. 13. E. F. Houghton and Co.

F93. INDUSTRIAL DEVELOPMENT. Published for the information of managements of chemical concerns interested in the selection of advantageous sites for post-war development and operations, an interesting pictorial pamphlet has been issued by the Cleveland Electric Illuminating Co.

F94. LABORATORY DIRECTORY. The directory of the American Council of Commercial Laboratories has been published to furnish business and governmental executives especially with means of acquiring information about the scope of activities of independent laboratories and the utilization of their services in solving scientific, engineering, testing, and inspection problems. Am. Council of Commercial Laboratories.

F95. MACHINE TOOL ACCESSORIES. A 12-page pamphlet contains illustrations, descriptions, and diagrams of machine tool accessories. Ideal Commutator Dresser Co.

F96. MATERIALS HANDLING. An attractive folder describes and illustrates various types of materials handling equipment and discusses the facilities and operations of Robins Conveyor, Inc.

F97. PACKAGING. A small interesting booklet No. 9 on packaging discusses the copyrighted method, Prepak, which covers prepacking, unit packing, and factory packing, with special emphasis on packing in corrugated boxes. Hinde & Dauch Paper Co.

F98. pH AND CHLORINE CONTROL. An 83-page handbook and catalog on the control of pH, chlorine, phosphates in boiler water, and in water analysis includes explanations of the meaning of such control, methods for making colorimetric determinations, and applications of pH and chlorine control to 31 different fields. W. A. Taylor & Co.

F99. PHOTOGRAPHY FOR RESEARCH. A service that places trained photographic engineers, ultra high speed equipment, and all accessory apparatus at the disposal of the research worker is described in a folder which shows case studies of various types of problems treated. McLarty Business Films.

F100. REFRACTORIES. A series of basic, acid and neutral refractories, the Gunmixes, and a gun required for the applications of the refractory Gunmixes, are described in an illustrated folder. Basic Refractories, Inc.

F101. ROTARY PUMPS. Facts about rotary pumps, the various types with illustrations and full descriptions, are offered in a colorful folder. Blackmer Pump Co.

F102. SPRAY EQUIPMENT. A new catalog No. 22 gives details of spray characteristics, dimensions and performance data on a complete line of standard spray nozzles. Spraying Systems Co.

F103. THERMOMETERS. Catalog No. 44 is an attractively-illustrated, well-arranged presentation of all types of clinical chemical and laboratory thermometers. Faichney Instrument Corp.

F104. THERMOCOUPLES. A new edition of the thermocouple data book and catalog Bulletin S2-r, gives descriptions of products, prices and recommendations for thermocouple users, and suggests substitutes for restricted materials. It gives data on selection of thermocouples, lead wire, protecting tubes, heads and insulators. Wheelco Instruments Co.

F105. VACUUM FILTERS. Filters used in metallurgical, chemical processing, food product, paper pulp, sewage disposal, cement and other industries are described and illustrated in Bulletin No. F-2002. Eimco Corporation.

F106. VALVES. Catalog 506 includes illustrations, tables, diagrams, and uses of slide valves and butterfly valves for control of air, gas, and liquids. W. S. Rockwell Co.

F107. V-BELTS. A four-page folder features information on the wire grommet type V-belt built with high tensile strength, high resiliency to shock, and assurance of little permanent stretch. B. F. Goodrich Co.

F108. V-BELTS AND SHEAVES. Simplified engineering data for fractional horsepower drives is offered in Bulletin B6249. Amply illustrated with installation photographs, line drawings and selection tables, the bulletin will interest manufacturers and operators of light duty power tools, fans, blowers, pumps, stokers, processing equipment, and numerous appliances. Allis-Chalmers Mfg. Co.

F109. V-BELT DRIVES. Comprehensive information and data on V-belts and pulleys including drive selection tables of drive combinations to relieve engineers, maintenance men, and mechanics of lengthy calculations is offered in catalog No. 280. The book is compact, indexed, and pocket-sized. Dayton Rubber Manufacturing Co.

F110. WIRE ROPE. Pamphlet No. 43-85 includes illustrations of wire rope constructions, descriptions, and applications and is available by requesting a copy on company letterhead from Macwhyte Company, Kenosha, Wisconsin.

WPB Steel Valve Catalogue Issued

A catalogue of 30,690 new surplus steel valves of various sizes and types has been published for the use of war contractors or others, the War Production Board has announced.

The list was published by the Surplus Program Section of the WPB Redistribution Division in cooperation with the Metals Reserve Company. It indicates the type of valves, catalogue specifications, manufacturers' names, and state location.

The list is a 50-page document, including both multi-purposes and specific use valves. It will be available for inspection by steel valve users in WPB's Regional or District Offices. Claimant Agencies will also have copies of the catalogue available.

All war contractors or other persons who have need for steel valves for war use are urged to get in touch with the nearest WPB field office, in order to determine if the types of valves needed are available. Persons needing steel valves may learn their location through the Surplus Program Section of WPB, 155 East 44th Street, New York City. In the case of valve manufacturers who might want to purchase steel valves to supply their orders, dealings will be carried on through the Metals Reserve Company.

CHEMICAL INDUSTRIES TECHNICAL DATA SERVICE

CHEMICAL INDUSTRIES, 522 Fifth Ave., New York 18, N. Y. (5-4)

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A637	A643	F85	F91	F97	F103	F109
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CANADIAN REVIEW

by W. A. JORDAN

Power Alcohol Legislation Looms Again in Postwar Discussions

Production of industrial alcohol during 1943 reached a record 14,554,582 gallons, according to official advice, of which 6,451,995 gallons were exported to the U. S. A.

Even though a large volume of alcohol has been produced by converted distilleries since 1942, it is apparent that the productive capacity of normal alcohol facilities is now far greater than peacetime consumer demand. One recently expanded unit is claimed to be able to accommodate, alone, the usual needs of the entire Canadian market.

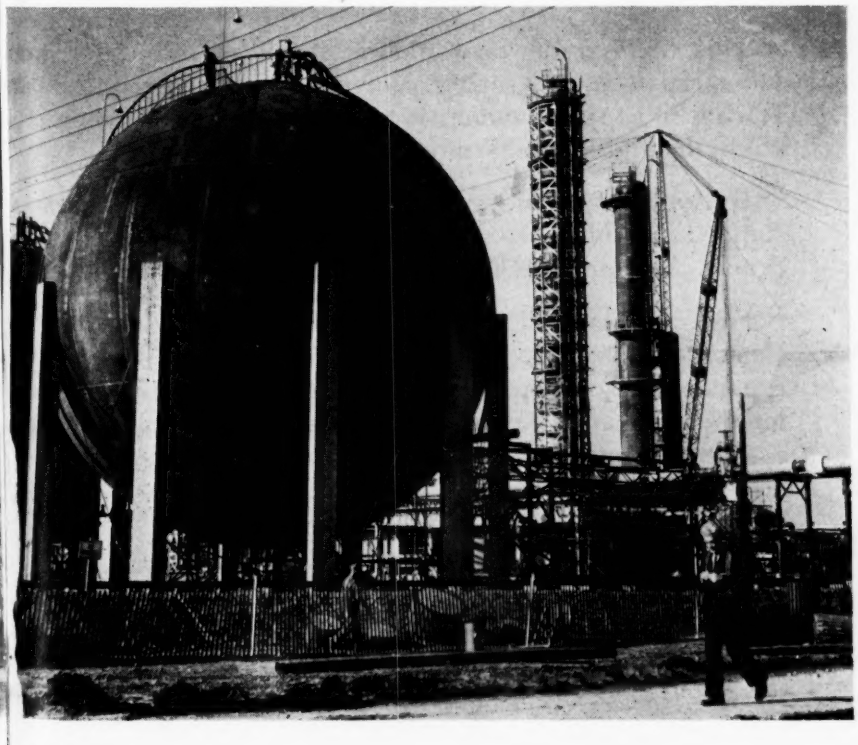
W. A. Jordan

As a result the future of the alcohol industry in Canada is being widely discussed, and it is evident that efforts are being made to generate Ottawa enthusiasm for power alcohol legislation. Similar efforts were made some years ago, but progress beyond the consideration stage was not realized.

In view of wheat food requirements it is extremely improbable that such power alcohol legislation is in the near offing, but a long term view suggests distinct promotional possibilities. Wheat surpluses have long been one of the dominion's problems, and the "wheat policy" has cost the Government some $100 million per year. Economically, the production of alcohol from wheat is not too attractive, but neither is wheat subsidization in normal times. One school of thought contends that wheat alcohol projects would eliminate the $100 million wheat charge, provide alcohol, and a million tons of high protein stock food.

Alcohol, too, is of interest to the pulp and paper industry as a potentially profitable by-product. Thereby, agriculture and pulp and paper, the Dominion's two biggest industries are involved, and it would appear that any sound proposal to bolster the fortunes of these industries is assured of a receptive Ottawa hearing.

The Polymer Corp. synthetic rubber plant at Sarnia, Ont., is a principal wartime consumer of Canadian alcohol.



Chemical Production Recovers Sharply

Chemical production, other than that from Government plants, came back sharply in March to register a two-point gain over February and four points over the corresponding month of a year ago. Furthermore, it is stated officially that the overall war-time chemical and explosives program, which has been easing off steadily for almost a year, is to be stepped up substantially.

This foreshadows more acute labor problems, and a further tightening in the availability of chemists and chemical engineers particularly. The Canadian position in this respect has never been too robust, and recent statements by the War-time Bureau of Technical Personnel indicate that current demand is still considerably in excess of visible supply, attributed by the Bureau in part to the continued movement of personnel to the armed forces.

Although war chemical production is slated to rise, calcium carbide demand has now slumped so seriously that the $3 million Shawinigan unit, which came in only a few months ago, has been shut down, at this writing, for the past few weeks. The entire output of this plant was for the U. S. A.

Chlorine, which although subject to usage restrictions, has been in relatively good supply, is now on the critical list. Ordinarily Canada produces sufficient chlorine for domestic needs, except on the West coast, and exports a surplus.

Potash Deposits Uncovered

Recent exploratory work conducted at the Malagash salt mine in Nova Scotia has revealed several hundred thousand tons of salt containing an average of eight per cent potassium chloride.

Additional deep level investigations are being carried on in the hope that more fruitful potash deposits may be uncovered which would be of real import to potash-short Canada.

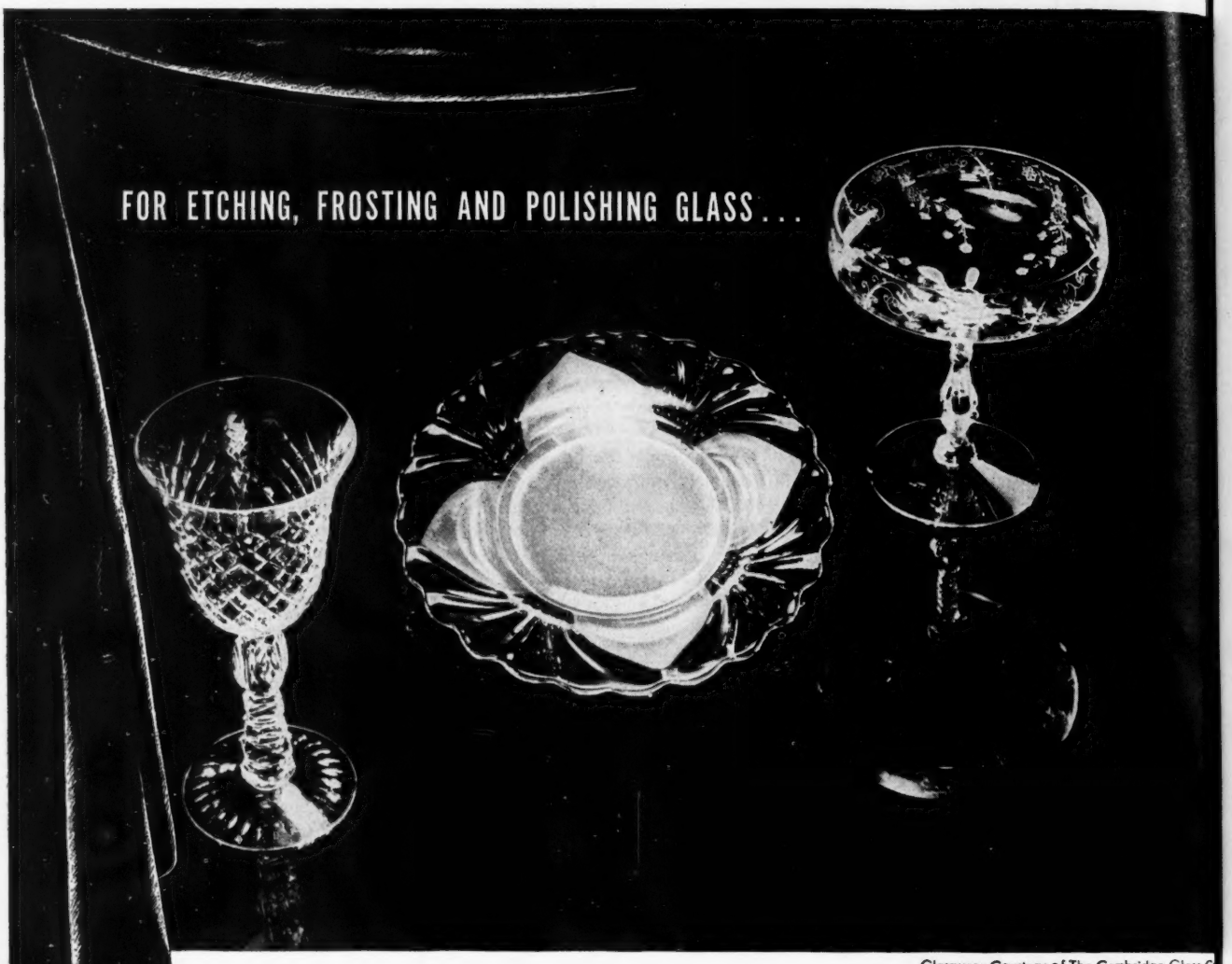
Although the present charted body could not be profitably worked solely for potash it is considered probable that joint salt-potash mining may serve to reduce the rather high production costs of Malagash common salt.

Plant to Make Mg Salts

Serious consideration is being given to plans for the construction of a plant in Quebec for the manufacture of magnesium salts from high Mg dolomite.

The exact size of the undertaking has

(*Turn to page 765*)



Glassware Courtesy of The Cambridge Glass C

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NEWS OF THE MONTH

Rubber Division Reports Progress

Copper compounds as vulcanization accelerators disclosed. Government chemists describe new synthetic, lactoprene, requiring farm products. Combining plastics, rubber yields useful properties.

CALLING synthetic rubber "a miracle of industry," Dr. Harold Gray of Akron, O., chairman of the Division of Rubber Chemistry of the American Chemical Society, opened the three-day session of the division in New York April 26 at which 32 papers on war-time research on rubber were presented.

Of special interest was the description of a new synthetic, lactoprene, by C. H. Fisher, W. C. Mast, C. E. Rehberg and Lee T. Smith, of the Eastern Regional Laboratory, Department of Agriculture, Philadelphia. Through the use of lactic acid as an intermediate, it was found that several abundant carbohydrates can be converted into approximately an equal w ight of vulcanized acrylic resins. The name "lactoprene" was proposed for this type of synthetic because of the key role played by lactic acid.

Electron microscope studies of natural and synthetic rubber fibers were reported by C. E. Hall, E. A. Hauser, D. S. Le Beau, F. O. Schmitt, and P. Talalay of the Massachusetts Institute of Technology. Utilizing techniques developed in the biological laboratories of the Institute for employment of electron microscopy in investigating long-chain molecules characteristic of protein fibers such as muscle, this research group ascertained facts about the structure of rubber which contribute further to the knowledge of why rubber stretches.

The swelling which natural rubber undergoes in the presence of mineral oil and the consequent loss in strength is one aspect of synthetic rubber research in which the goal is to overcome rather than to reproduce a property of natural rubber. A paper presented by P. O. Powers and B. R. Billmeyer of Armstrong Cork Co., Lancaster, Pa., discussed the comparative swelling of synthetic rubbers in mineral oils. In 1940, Carman, Powers and Robinson of the Armstrong Cork Co. reported that the amount of swelling of Neoprene, Thiokol, and Perbunan in the presence of mineral oils could be accurately estimated from aniline points of the oils. The present paper extends the earlier work of Hycar OR15 and Stanco Perbunan, oil-resistant rubbers. The study has also been extended to volatile oils, aromatic gasoline and kerosene. Results show that there is a definite relationship between the amount of swelling and aniline point and that a definite increase in swelling is to be expected as the aniline point of the oil is lowered.

Copper, long avoided by the natural rubber industry, was disclosed as a new and powerful agent in the production of synthetic rubber. A. A. Somerville, vice-president of R. T. Vanderbilt Co., disclosed that two new copper vulcanization accelerators, known as "Cumate and Cuprax," will increase the output and improve the quality of synthetic rubber. These two accelerators are said to be several times as powerful as the conventional type now in use.

The high tire temperature resulting from the use of fine carbon blacks in Buna S has limited its civilian use. This technical difficulty, long a headache to chemists, is eliminated when non-black pigments are employed according to the paper of Alan R. Lukens, research director of Thompson, Weinman and Co., Cambridge, Mass. Mr. Lukens said the most widespread advantage to rubber chemists to be found in the non-black extender pigments is shown to be their ability to work well in conjunction with the carbon blacks used in Buna rubber, rather than by themselves as the only pigment.

R. A. Emmet, research chemist of B. F. Goodrich Co., disclosed how the gap between plastics and rubbers had been closed in uniting plasticized vinyl chloride resins with certain butadiene type synthetic rubbers to effect vulcanizable blends that can be extruded, molded, calendered, and spread. Properties possessed by the combination which are better than when the oil-resistant rubber is used alone are extreme resistance to the effects of sunlight and ozone, increased resistance to benzene and similar aromatic solvents, both in swelling and cracking, low temperature flexibility combined with excellent heat resistance, improved flexing life, and tear resistance.

Geiger Elected Officer United Chemicals, Inc.

Marlin G. Geiger, a vice-president and director of Westvaco Chlorine Products Corporation and resident manager of that company's South Charleston plant has been elected vice-president and director of the United Chemicals, Inc.

Through its ownership of Barium Products, Ltd. with plants at Modesto and San Francisco, this company is an important factor in the production of chemicals for military pyrotechnics. United Chemicals, Inc. also owns Monarch Chemical Company, a leading manufacturer of baking powder and the Curtin-Howe Corporation, a pioneer in wood-preserving chemicals and processes.

Companies Pool Gasoline Patents

Six of the nation's oil companies that hold patent rights for the development of high-octane aviation gasoline and toluene, a necessary element of high explosives, have agreed on terms under which other American refining plants may use the patented processes for the manufacture of those war items, the Petroleum Administration for War announced recently

About forty units already are refining aviation gasoline and toluene under these processes or are being constructed for that purpose, Harold L. Ickes, PAW Administrator, disclosed. The agreement was announced following assurances by Mr. Ickes some time ago that a formal order would be made later, establishing precise terms under which refineries would use the patented processes.

Specifically involved in the agreement are the companies' patent rights on fluid catalytic cracking processes, which are used to make aviation gasoline, and hydro-

catalytic reforming processes, essential in making both the gasoline and toluene.

The companies that have entered into the plan, virtually pooling the results of their research, are the Shell Development Company, Texaco Development Company, Standard Oil Development Company, a subsidiary of Standard Oil of New Jersey; Standard Oil of Indiana, Universal Oil Products Company, and the M. W. Kellogg Company. Although the Anglo-Iranian Oil Company and International Catalytic Oil Processes Corporation are not actual parties to the agreement, they also will make their patent rights available under the same terms, the PAW said.

Ralph K. Davies, deputy PAW administrator, explained that royalty rates on the new catalytic processes are the lowest ever granted by the owners of the processes. It was agreed also, he said, that patent owners shall charge no royalty or its equivalent on the products that they make themselves for the Government during the emergency.

Mr. Davies emphasized that the companies "grouped together on their own initiative" without any selection by the PAW. Other companies, he added, may form similar groups and likewise offer their patents for common use under a Government sanctioned agreement on licensing terms and royalty rates.

Registration of Technical Men Entering Services

Anticipating the possible future necessity of withdrawing technical men from the armed forces in order to assign them to important research or production work in civilian war industry, the National Roster of Scientific and Specialized Personnel has asked that all such men entering the armed forces immediately notify the Roster of the branch of the armed forces they are entering, the date and place of their induction, their serial number. Employers have also been asked to see that all professionally qualified young engineers, chemists, physicists, geologists, mathematicians, etc., in their employ are registered with the Roster if they have not already done so. Communications should be addressed to the National Roster of Scientific and Specialized Personnel, 1006 U Street, N. W., Washington 25, D. C.

Air Fuel Output Revealed

The output of 100-octane gasoline has been stepped up from a prewar total of 40,000 barrels a day to more than 400,000 barrels, or "enough to send 10,000 planes over Berlin every day in the year," Secretary Ickes, Petroleum Administrator for War revealed at a press conference recently.

Announcement of the all-time high production figure and of plans for the considerable increase of this daily rate between now and the end of the war, was made by Mr. Ickes in the presence of a group of Army and Navy officers who joined with officials of the PAW in a general discussion of the remarkable developments in this super fuel.

I. E. Smith Appointed Victor Sales Manager

O. H. Raschke, director of sales of Victor Chemical Works, announces the appointment of Irwin E. Smith as sales manager, effective May 1.
Mr. Smith has been associated with Victor for 21 years and is well known among the flour milling, food processing, and chemical industries. He is a member of the Chicago Drug & Chemical Association, and of the Chicago Perfumery, Soap, and Extract Association, and has served on the board of directors of both organizations.

WPB Offers Manpower Guide

In response to thousands of employers' requests for advice and assistance in dealing with Selective Service procedures, the War Production Board has reported that the WPB Office of Manpower Requirements has prepared a concise summary of the steps which an employer should take to obtain full consideration for deferment of essential employees.

The new publication entitled ,"Advice to Employers Regarding Selective Service Procedures," emphasizes the various steps which an employer must take through local and state Selective Service channels before WPB can undertake to assist in cases of key employees.

The publication explains the bases for occupational deferments, the special procedures affecting registrants under 26 years of age, local and state Selective Service board procedures, and the use of replacement schedules.

The new "guide" summarizes the assistance which the WPB Regional and District Offices can provide, and also explains the procedures whereby, after all local avenues of relief have been exhausted, appeals for assistance in presenting special cases to the Selective Service may be directed to industry division of the WPB and to the Office of Manpower Requirements.

Plasma Dehydrating Plants to Open

Dried blood plasma will be made available to the Russian armies for the first time through the use of equipment being supplied through the American Red Cross to the Union of Red Cross and Red Crescent Societies of the U.S.S.R. The Russians heretofore have made use of whole blood and frozen plasma for war casualties.

Four dehydrating plants of a new type, each of which is capable of processing 1,000 units of plasma a day, will be furnished. Designed and built by the National Research Corporation, of Boston, the new plants dehydrate blood plasma under high vacuum at extremely low temperature. Through the use of high vacuum diffusion pumps the units remove both air and water vapor more rapidly and economically than has been previously possible.

The equipment is being purchased through the Procurement Office of the U. S. Treasury under the provisions of an Act of Congress making available $85,000,000 to the President for the relief of men, women, and children of war-stricken lands. Supplies bought with this money are turned over to the American Red Cross or other agencies which might be designated for allocation and shipment abroad.

The plasma plants, to be delivered in June, were ordered after Dr. V. V. Lebedenko, representing the Union of Red Cross and Red Crescent Societies, made a study of a pilot plant operated by the National Research Corporation in Boston. The principle employed is the same as that now being widely used in dehydrating penicillin in several of this country's large chemical plants.

Textile Research to be Established at Princeton

Decision by the Textile Research Institute, Inc., to establish headquarters at Princeton, N. J., for the prosecution of research and for the training of personnel on the graduate level, has been announced by the Institute. The decision was reached after very careful study and examination of the facilities at many universities, by a special committee appointed by the Institute for this purpose. The actual move will take place as soon as it is feasible to secure and equip laboratories.

Textile Research Institute, Inc. will use Princeton facilities for—(a) for the prose-

cution of a program of research in fundamental and applied science, basic to the textile industry and in economic research, (b) for the dissemination of research information and (c) for the training of personnel in such methods of study and research.

Stieh Becomes President Metal Salts Corporation

Wm. M. Stieh has resigned his post as director and vice president of F. W. Berk & Co., Inc., effective in April. Mr. Stieh has been identified with the Berk Company and subsidiaries for the past eleven years and actively engaged in the sale of mercury derivatives for the past fifteen years. Mr. Stieh is leaving the company to assume his new duties as president of the Metal Salts Corporation, a new organization now being formed, with temporary offices in the People's Trust Building, in Hackensack, N. J.

Metal Powders Committee Organized

A new standing committee B-9 on Metal Powders and Metal Powder Products, has been organized by the American Society for Testing Materials to undertake the formulation of specifications and methods of tests for these materials. Technical representatives of leading producers and consumers of the material are serving on the committee and its subgroups, with W. A. Reich, Works Laboratory, General Electric Co., Schenectady, N. Y., as chairman, and W. R. Toeplitz, Production Manager, Bound Brook Oil-Less Bearing Co., Bound Brook, N. J., as secretary.

The great expansion in use of metal powder products has resulted in a number of suggestions in the past year or two that A.S.T.M. extend its technical activities to cover these fields. Following the Symposium on Powder Metallurgy in March, 1943, there was increased stimulus and the committee held its organization meeting in February, 1944.

Subcommittees organized and their chairmen are as follows: nomenclature and technical data, chairman, F. N. Rhines, Carnegie Institute of Technology, Pittsburgh, Pa.; metal powders, chairman, D. O. Noel, Metals Disintegrating Co., Inc., Elizabeth, N. J.; metal powder products, chairman, R. P. Koehring, Moraine Products Division, General Motors Corp., Dayton, Ohio.

These three chairmen, with Reich and Toeplitz constitute the Advisory Committee that is responsible for the administration of Committee B-9.

Prior to the organization meeting a number of conferences and discussions were held by those participating in the committee work in order that numerous problems could be viewed objectively, and best methods of solution tentatively agreed on.

CALENDAR OF EVENTS

AMERICAN ASSOCIATION OF CEREAL CHEMISTS, Annual Meeting, Nicollet Hotel, Minneapolis, Minn., May 23-25.
AMERICAN ELECTROPLATERS' SOCIETY, Annual Convention, Cleveland Hotel, Cleveland, O., June 12-14.
AMERICAN GAS ASSOCIATION, Joint Production and Chemical Committee Conf., Hotel Pennsylvania, New York, N. Y., June 6-7.
AMERICAN GEAR MANUFACTURERS ASSOCIATION, Westchester Country Club, Rye, N. Y., May 22-24.
AMERICAN INSTITUTE OF CHEMICAL ENGINEERS, 36th Semi-Annual Meeting, Hotel Cleveland, Cleveland, O., May 14-16.
AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS, Summer Technical Meeting, Jefferson Hotel, St. Louis, Mo., June 26-30.
AMERICAN MANAGEMENT ASSOCIATION, Annual Meeting, Hotel Pennsylvania, New York, N. Y., June 8.
AMERICAN PHARMACEUTICAL MANUFACTURERS' ASSOCIATION, Annual Meeting, The Homestead, Hot Springs, Va., June 5-7.
AMERICAN SOCIETY FOR TESTING MATERIALS, Annual Meeting, Waldorf-Astoria Hotel, New York, N. Y., June 26-30.
AMERICAN WATER WORKS ASSOCIATION, Annual Conference, Milwaukee, Wis., June 13-16.
CANADIAN CHEMICAL CONFERENCE, Royal York Hotel, Toronto, Canada, June 5-7.
CHICAGO RUBBER GROUP, Morrison Hotel, Chicago, Ill., May 19.
FLAVORING EXTRACT MANUFACTURERS' ASSOCIATION, Annual Meeting, Hotel New Yorker, N. Y., May 22-23.
INDUSTRIAL RESEARCH INSTITUTE, Convention, Pittsburgh, Pa., May 19-20.
INSTITUTE OF FOOD TECHNOLOGISTS, Annual Meeting, Edgewater Beach Hotel, Chicago, Ill., May 29-31.
NATIONAL ASSOCIATION OF PURCHASING AGENTS, Annual Convention, Waldorf-Astoria Hotel, New York, N. Y., May 29-31.
NATIONAL METAL TRADES ASSOCIATION, Hotel Biltmore, New York, N. Y., May 15-18.
SOCIETY OF AUTOMOTIVE ENGINEERS INC., National Diesel-Fuels & Lubricants Meeting, Hotel Knickerbocker, Chicago, Ill., May 17-18.

War Property Surplus News Letter Issued

Inauguration on May 7 of a weekly Washington Newsletter on surplus U. S. Government war goods and property was announced recently to American business executives and corporations.

The Newsletter will give a weekly running account of the government's plans in offering surplus property and goods for sale. It will also report on the activities of surplus property units set up, or to be set up, in the Treasury Department, War Food Administration, Reconstruction Finance Corporation, Maritime Commission, War Shipping Administration, Office of Price Administration and War and Navy Departments. It will report official actions of the Surplus War Property Administration.

Editor is Vincent F. Callahan, for many years Washington newspaper man and radio executive, and for the past three years national Director of the U. S. Treasury's War Bond Promotion in advertising, press and radio.

The service will have a staff of Washington reporters who will contact key officials, analyze and digest decisions, policies and regulations and cover all proposed legislation and hearings bearing on surplus goods.

The aim of the Newsletter is to offer a service not only to persons or corporations interested in purchasing surplus goods, but also to manufacturers and others whose business will be affected when the government unloads nearly a million items ranging from thumb tacks to printing presses and airplanes.

"Surplus War Property Newsletter" will be issued from Mr. Callahan's new offices at 1701 H Street, N.W., Washington 6, D. C.

Klein Named Western Sales Manager

The Calco Chemical Division of the American Cyanamid Company has named Sam Klein the organization's western sales manager. Mr. Klein's appointment was effective May 1, at which date he established his offices in Chicago. For the past 20 years he has been in charge of Calco's Lake Department.

New Electron Microscopes Announced

Two new RCA electron microscopes—one a Universal model which incorporates an electron diffraction camera and

the other a smaller console model of an entirely new type—were announced in a paper presented jointly by V. K. Zworykin, James Hillier and Perry C. Smith of the Radio Corporation of America before the National Wartime Conference of the Society of American Bacteriologists at the Hotel Pennsylvania, N. Y., on May 5th.

In the first part of the paper, comprising a review of recent developments in electron microscopy pertaining to the field of bacteriology, Dr. V. K. Zworykin, associate director of RCA Laboratories, and Dr. James Hillier, pioneer in the development of electron miscroscopes, disclosed important new applications of the electron microscope in this field, among them the use of this powerful electronic magnifying device in a study of the effects of disease-inhibiting drugs such as penicillin and sulfanilamide.

The console model, it was explained, is especially suitable for use in smaller laboratories, in schools, in hospitals, and from process control and material control in factories. Because of its simplicity of operation, it can be operated with a minimum of training. It is particularly well suited for control and analyses operations which have been more or less standardized. It is expected to find widespread use for this purpose in the chemical, metallurgical, textile, food and petroleum industries as well as in the bacteriological field.

Chemical Exposition Planned

Sponsored by the Chicago Section of the American Chemical Society, the third National Chemical Exposition will be held Nov. 15 through 19, 1944 at the Chicago Coliseum, it is announced by M. H. Arveson, chairman of the Exposition Committee.

Marcus W. Hinson, manager of the first two national shows, will direct the November exposition. He states that more than 50,000 square feet of floor space will be made available, all of which is on one floor.

Associated on the show committee with Mr. Arveson, who is identified with the Standard Oil Co. of Indiana, are Edward Bicek of the Illinois Institute of Technology, Victor Conquest of Armour and Co., L. E. May of the Sherwin-Williams Co., C. S. Miner, Jr., of Miner Laboratories, R. C. Newton and H. E. Robinson, both of Swift and Co., and B. B. Schneider of Schneider and Dressler. L. M. Henderson of the Pure Oil Co., President of the Chicago Section, is ex-officio a member of the committee.

Headquarters for the show have been opened at 330 South Wells Street, Chicago 6, Illinois.

Quartermaster Corps Utilizes Surplus Stocks

Established only a few months ago, the Excess and Surplus Property Section, Office of The Quartermaster General, already has saved the Government approximately $2,000,000, plus the fact that it has been able to save a great number of contract worries for the Army and additional orders which would otherwise be placed with an already overloaded industry, the War Department has announced.

The new Quartermaster section was established under War Department Regulation No. 7, which provided that each service, before contracting for equipment for which it had purchase responsibility check with all other services to see if they had any Excess Supplies or equipment of the type required and to use such supplies before going through contracting procedure.

Dow Chemical Promotes Dixon

W. R. Dixon of The Dow Chemical Company has been appointed assistant manager of the company's plastic engineering division, the company has announced.

Quinine From Mexico

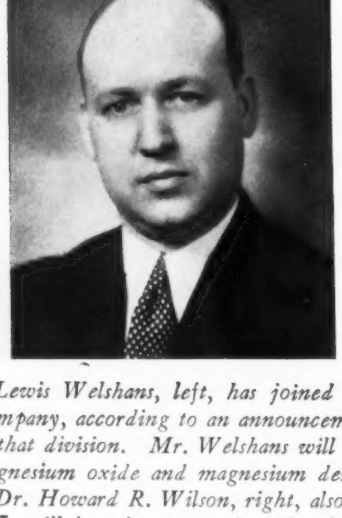
Studies to determine the practicability of developing new cinchona plantations in Mexico are being conducted by the Department of Health. About 60,000 cinchona plants are under cultivation in the State of Chiapas. Production of quinine eventually may be sufficient to meet all domestic requirements and provide an export surplus.

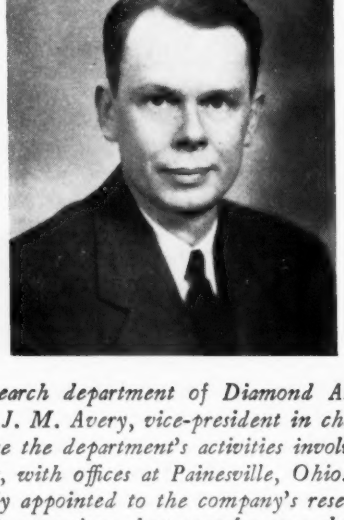
Synthetic Rubber Film Released

One of the most phenomenal war-time achievements of American industry—the quantity production of synthetic rubber from petroleum and coal-tar products and other substances—is portrayed in a new sound motion picture, "Synthetic Rubber" which has been released by the Bureau of Mines for free showing.

The 16-millimeter film, produced in cooperation with a large manufacturer of synthetic rubber, traces the history of the development of the first rubber-like material in 1892 to present-day production methods which will make possible the output of between 850,000 and 875,000 tons of synthetic rubber in 1944, according to Dr. R. R. Sayers, Bureau Director. He informed Secretary of the Interior Harold L. Ickes that the manner of approach employed in the film makes it ideal for showing before all types of audiences, war-training classes, the armed forces, public and private schools, civic organizations, and other groups.

Diamond Alkali Adds to Staff





Lewis Welshans, left, has joined the research department of Diamond Alkali Company, according to an announcement by J. M. Avery, vice-president in charge of that division. Mr. Welshans will supervise the department's activities involving magnesium oxide and magnesium derivatives, with offices at Painesville, Ohio.

Dr. Howard R. Wilson, right, also recently appointed to the company's research staff, will function on projects involving unit operations, heat transfer, gas absorption, and equipment design.

INDUSTRY ADVISORY COMMITTEES

Essential Oils Industry

An essential oils industry advisory committee to work with government agencies on essential oils programs, has been organized by the War Food Administration. The committee is composed of representatives from the essential oils industry. A. L. Kalish, of the Office of Distribution, WFA, is chairman.

The committee will advise and receive assistance from government agencies on wartime essential oils problems. There are approximately 100 of the essential oils, including spice oils, food oils, citrus oils, floral oils and medicinal oils distilled from herbs. Most essential oils are imported and come from all parts of the world. Many oils which are normally imported from the southwest Pacific and Europe are not obtainable at present. Some of the plants from which such oils are obtained are, however, now being cultivated in the United States.

Tentatively the committee's first meeting is scheduled to be held in Washington D. C., sometime in May. Committee members are: F. G. Buehler, George Lueders & Co., N. Y.; Gerard J. Danco, Gerard J. Danco, Inc., N. Y.; F. T. Dodge, Dodge & Olcott Co., N. Y.; F. W. Heine, Compagnie Duval, N. Y.; Walter H. Jelly, Walter H. Jelly & Co, Inc., Chicago, Ill.; Dr. H. J. Kohl, Norda Essential Oil and Chemical Co., N. Y.; Dr. Eric C. Kunz, Givaudan-Delawanna, Inc., N. Y.; Percy C. Magnus, Magnus, Mabee & Reynard, Inc., N. Y.; R. R. Webb, W. J. Bush & Co., Inc., N. Y.; H. P. Wesemann, Fritzsche Bros., Inc., N. Y.

Vegetable Wax Importers, Dealers

Appointment of ten representatives of importers and dealers in vegetable waxes to an industry advisory committee was announced by the Office of Price Administration recently.

Vegetable waxes include carnauba and ouricury waxes imported from Brazil; candelilla wax, from Mexico; beeswaxes, imported from many different parts of the world, and domestic beeswax, collected in this country.

The members of the committee are: C. S. Bullock, American Cyanamid and Chemical Corporation, N. Y.; Charles Christman, Smith and Nichols, Inc., N. Y.; L. L. deLyra, Wessel, Duval and Company, Inc., N. Y.; J. E. Godoy, W. R. Grace and Company, N. Y.; Roy A. Grant, Dadant and Sons, Hamilton, Ill.; Arthur H. Hoffman, Strohmeyer, and Arpe Company, N. Y.; Fallon O'Byrne, Bee Industries, Ltd., Alhambra, Calif.; Alan Root, The A. L. Root Company, Medina, O.; Frank B. Ross, Frank B. Ross Company, Inc., Hoboken, N. J.; E. Schuemann, D. Steengrafe and Company, N. Y.

Mercury Chemicals Manufacturers

The Primary Mercury Chemicals Manufacturers Industry Advisory Committee met on March 14, 1944, to discuss the formation of a plan to liquidate the Army's surplus inventory of mercuric chloride with the minimum dislocation to the producing industry. J. W. Wizeman (Chemicals Bureau, WPB) was the Government presiding officer. Committee members include: W. C. Barry, Mallinckrodt Chemical Works, N. Y.; N. M. Stieh, F. W. Berk and Co., Inc., Wood Ridge, New Jersey; W. E. Clapham, Merck and Co., Inc., Rahway, New Jersey; A. A. Teeter, Charles Pfizer Co., N. Y.

Chemical Warfare Service now has an excess supply of mercuric chloride amounting to 364,450 pounds. This represents about 5 months' sales of mercuric chloride at the 1943 rate of sales or 8 months' sales at the 1942 rate. Industry pointed out that neither 1942 nor 1943 could be considered as representing a normal or average base because during those years the industry sold large amounts to Chemical Warfare Service. The surplus supplies which Chemical Warfare Service desires to liquidate represent a considerable proportion of industry's production and constitute a real threat to the industry.

Information supplied by one of the producers indicates that the mercuric chloride held by the arsenals should keep at least a year without deteriorating if it is packed in a dry place. If some caking should occur, the material could be made suitable for pharmaceutical purposes by a simple grinding operation. Major Totten (Chemical Warfare Service) stated that much of the material owned by CWS has been kept for 6 months or a year or even longer; it is possible that the material may already have begun to deteriorate. CWS feels that the bichloride should be disposed of, and the Chemicals Bureau of WPB is requesting the industry to advise on how this can be done with the least possible dislocation to the producing industry.

The Division feels very strongly that domestic mine production should not be stopped at this time in view of general uncertainties. Mercury represents a relatively small item, but closing down of the mines would set a precedent for other minerals which might result in serious repercussions. Mr. Lund pointed out that domestic production will undoubtedly decline as a result of declining prices.

Mr. McEwen (Miscellaneous Minerals Division, WPB) estimated that present stocks of metallic mercury are approximately 100,000 flasks. This represents about 2 years' requirements.

Gangrene Antitoxin Producers

The Chemicals Bureau of the War Production Board has reported that members of the WPB Gas Gangrene Antitoxin Producers Industry Advisory Committee has been asked to submit proposals for producing all or any part of 1,350,000 doses of gas gangrene antitoxin for lend-lease. Gas gangrene is an infection resulting from bacteria in wounds and the antitoxin is biologically produced.

Members of the committee informed Chemicals Bureau officials that manpower shortages would constitute the biggest obstacle to production of the antitoxin, although only between 100 and 200 men would be needed.

Hydrofluoric Acid Manufacturers

The Hydrofluoric Acid Manufacturers Industry Advisory Committee met on March 7, 1944, to discuss (1) anhydrous hydrofluoric acid (devoting special attention to supply and requirements, possible production increases, allocation, and a task committee report on sampling and analysis); (2) aqueous hydrofluoric acid (considering chiefly supply and requirements and possible adoption of allocation); and (3) manpower.

J. W. Wizeman (Chemicals Bureau, WPB) acted as Government presiding officer. Committee members include: Park Kelley, Tulsa Chemical Co., Tulsa Oklahoma; W. W. Lawson, Harshaw Chem. Co., Cleveland, Ohio; C. R. Lindsay, Lindsay Light & Chem. Co., Chicago, Illinois; C. D. Porch, Kinetic Chemicals Co., Wilmington, Delaware; F. M. Prince, Pennsylvania Salt Co., Philadelphia, Pa.; D. I. Trainer, General Chem. Co., N. Y.

S. Wallach (Chemicals Bureau, WPB) said that requirements were comparable to those presented at the last meeting of the committee and that the improvement in the situation is the result of new productive capacity and the removal of bottlenecks in existing plants.

Mr. Wizeman believed that, so far as can be foreseen at this time, production will meet requirements during 1944. The deficit shown for the second quarter should be offset by stocks remaining at the end of the first quarter, and the situa-

tion should be comparatively easy in the latter part of the year. He cautioned, however, that the estimated surplus for the year could be easily wiped out by a plant break-down or other emergency, or by an unexpected rise in requirements.

Dr. R. Reuter (Petroleum Administration for War) told the committee that alkylation plants will consume 2 pounds of acid per barrel of alkylate produced for the first 3 months and 1½ pounds of acid per barrel of alkylate produced thereafter. A few plants will probably vary from this.

Dr. Reuter did not know how exactly actual consumption will correspond with estimates; he emphasized that most of the plants are still in a somewhat experimental stage and that a lack of experience prevails generally. At the end of January about seven alkylate plants were operating or had attempted to operate; only about four, however, had obtained a definite idea of their requirements. A great many technical difficulties have arisen; for example, in many cases, the acid has eaten through the electrically welded tubes in heat exchangers used by a number of plants. Experimental study had not indicated that this problem would arise in actual practice.

The lowest rate of consumption of acid so far attained in the industry has been 1 pound per barrel, although pilot plant experience on the basis of which the process was sold to the industry, was 6/10ths pound per barrel. The plant which has reduced its consumption to the 1-pound level (incidentally, one of the smallest plants in the program) has done away with all double-valving in the plant; plant operators believe that the double-valving system accounts for a large amount of loss.

COMPANIES

Allied Asphalt Reorganized

George J. O'Sullivan

The Allied Asphalt and Mineral Corporation, manufacturers of asphalt, pitches, and other coatings, and compounders of pitches and Gilsonite to specifications, has completed an extensive reorganization in the executive ranks of its production, research, and sales personnel it was announced by George J. O'Sullivan who has been vice-president and general manager of the company since January 1.

All manufacturing processes are now under the direct supervision of Glenn P. Smith, chemical engineer, who was associated previously with the United States Rubber Company as process engineer of its synthetic rubber plant at Naugatuck, Conn. Mr. Smith received his B.S. in chemistry at the University of Illinois.

Samuel C. Robison, widely known as a pioneer in the developing of coatings and formerly in charge of research and development work for Continental Can, has been placed in charge of all research and development projects for Allied. He is a graduate of the University of Alberta, where he received his B.S.A., and of McGill University, where he received his M.Sc.

Daniel D. Downes, for many years associated with Newport Industries, has been appointed to direct sales.

Allied's Wax and Oil Division will continue under the direction of Heinz H. Kraaz, pioneer and specialist in the development of waxes and formerly with the Ernst Schliemann Company.

Ferrari, Peterson, Join Standard Brands

Dr. Charles G. Ferrari, left, prominent in the field of cereal chemistry, has been added to the research and development division of Standard Brands Inc. He assumed his new post May 15. Since 1930, Dr. Ferrari has been connected with General Mills, Inc., in its research department.

Dr. Joel B. Peterson, right, joins the applied research department of the company as technical consultant for pharmaceuticals.

Wayne Organizes Plastics Division

The Wayne Oil Burner Company of Fort Wayne, Indiana, has expanded into a new field with the formation of a plastics division, known as Wayne Plastic Products, Edward H. Berghoff, president of Wayne Oil Burner Co. announced.

Production has been started on the fabrication of plastic items from thermo-setting high impact materials. At the present, the Wayne Plastic Products plant is only doing custom molding for manufacturers using plastic parts in war equipment, but after the war, plans call for rapid expansion of the plant to permit the production of many standard items in the domestic and industrial field. The company is also giving consideration to the manufacture of its own basic materials after the war.

New 100-ton compression equipment, including molding presses, pre-forming presses and pre-heating units, has been installed in the Wayne Plastic Products plant, which is unique in having complete facilities under one roof for designing, mold making, chrome plating and molding.

John W. Ferris, former model railroad equipment and plastic parts manufacturer at Huntington, Indiana, has been named plant manager of the new division.

Company Notes

THE KRETOL CO., INC. announces its removal to 1315 14th Street, N. W., Washington, D. C.

HOOD CHEMICAL CO., INC. announces the removal of its New York Office to 1819 Broadway, N. Y. 23, N. Y.

U. S. INDUSTRIAL CHEMICALS, INC. announces with regret the resignation, as of April 14, 1944, of Mr. A. J. Wittenberg, Vice-President of the Company and Director of the Stroock & Wittenberg Division.

THE CENTRAL CHEMICAL SULPHUR CORPORATION, Harrisburg, Va., has been issued a certificate of authority by the Virginia State Corporation commission to manufacture and deal in sulfur, compounds containing sulfur, chemicals and chemical compounds. Maximum capital of the firm is $100,000.

THE B. L. LEMKE COMPANY has announced, effective April 1, 1944, that it has changed from an individual proprietorship to a partnership and that it will henceforth operate under the name of B. L. LEMKE AND COMPANY; however, there has been no change in the management of the company.

INDUSTRIAL SALES CORPORATION, 295 Madison Avenue, New York, N. Y., announces that it has moved to new and larger quarters at 500 Fifth Avenue, New York, N. Y. The new telephone number is Longacre 3-3663.

Industrial Sales Corporation are importers and exporters of raw materials and specialize in pharmaceuticals, and allied products.

CHARLES A. FRANKENHOFF, chairman of the board of directors of The Dicalite Company, manufacturers and distributors of diatomaceous earth products, announces his resignation from these offices effective February 15, 1944. Frankenhoff organized the company and was its president and general manager for its entire period of operations to July 1943.

DDT Production Increased

Production of DDT, the war-developed insect powder, is expected to be expanded sufficiently during the next several months to provide for all needs of the military in its insect control programs, the Chemicals Bureau of the War Production Board announced recently.

At present, all production is going to the military except small quantities released for experimentation, but limited civilian distribution for agricultural and essential civilian uses may be possible later in 1944.

The production prospects were outlined recently at the first meeting of WPB's DDT Producers Industry Advisory Committee, which includes all actual producers of DDT. The Chemicals Bureau officials reported that raw materials sufficient to provide for all contemplated production increases were assured.

Brig. Gen. Stanhope Bayne-Jones, chairman of the U. S. Army Typhus Commission, who reported that the dusting of 1,300,000 Neapolitans with DDT had cut new typhus cases from 60 to 10 a day, checking a dangerous epidemic, said DDT was now an important factor that might have an effect on the history of the world. By making it possible to avert customary war and post-war typhus epidemics, it might make a great practical difference in the capacity of the European peoples to regenerate themselves and their governments, he said.

Proposals for changing specifications to permit greater production volume were brought up and discussions along this line will be continued between technicians from manufacturers' laboratories and armed service representatives.

Low Cost, Multi Use Acid Proof Tower

BECAUSE it is entirely corrosion proof and flexible in design, this versatile low-cost Knight-Ware Tower can be adapted to a wide range of chemical processes.

Filled with Berl Saddles, Knight-Ware Towers are in use as absorbers, scrubbers and distillation columns. The one shown in the illustration is 24″ inside diameter by 14′ 8″ high. Actually Knight can make these towers up to 60″ inside diameter and as high as desired by adding on extra sections.

Being Knight-Ware, they are completely acid proof. They are made specially to serve individual needs. Note the flange connections on this one. In writing for information and prices, please give us complete data on your needs.

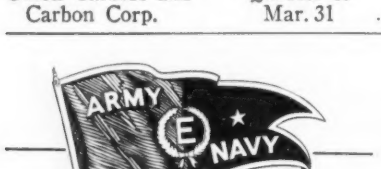
MAURICE A. KNIGHT

205 Kelly Ave., Akron 9, Ohio

KNIGHT-WARE CHEMICAL EQUIPMENT

Company Earnings—First Quarter, 1944

Company	*Period*	*Taxes* 1944-1943	*Net Profit* 1944-1943
Air Reduction Co. and Subsidiaries	Quarter to Mar. 31	$3,165,749–$3,303,065	$1,430,214–$1,730,633
Atlas Powder Co.	Quarter to Mar. 31	$875,000–.....	$328,222–.....
Canadian Indus., Ltd.	Year to Dec. 31	.....–$3,150,500	.....–$4,444,770
Cuban-American Manganese Corp.	Quarter to Mar. 31	.....–.....	$69,525–$99,512
Freeport Sulphur Co.	Quarter to Mar. 31	.....–.....	$601,426–$639,764
General Electric Co.	Year to Dec. 31	.....–$206,000,000	.....–$44,922,846
Hercules Powder Co.	Quarter to Mar. 31	$2,962,832–$5,062,968	$1,137,958–$1,378,410
The Mathieson Alkali Works (Inc.)	Quarter to Mar. 31	$350,000–$410,000	$289,629–$339,164
McKesson & Robbins, Inc.	Quarter to Mar. 31	$4,090,007–$3,077,260	$1,307,363–$1,277,623
Middle States Petroleum Corp.	Year of 1943	.....–.....	.....–$328,005
New Jersey Zinc Co.	Quarter to Mar. 31	.....–.....	$1,354,929–.....
Tennessee Corp. and Subsidiaries	Year to Dec. 31	.....–$1,400,000	.....–$1,478,003
Texas Gulf Sulphur Co. (Inc.)	Quarter to Mar. 31	$1,631,000–.....	$1,926,070–.....
Tubize Rayon Corp.	Quarter to Mar.	.....–.....	$257,896–$315,869
Union Carbide and Carbon Corp.	Quarter to Mar. 31	.....–.....	$9,009,070–.....



The following companies have recently been awarded the Army-Navy "E" for excellence in production of war materials.

Army-Navy "E" Awards

General Aniline & Film Corp., Grasselli Plant, Linden, N. J.

Heyden Chemical Corp., Cherokee Ordnance Works, Danville, Pa.

I. F. Laucks, Inc., Seattle, Wash.—Second Star added to flag.

ASSOCIATIONS

Cereal Chemists Meet

The 30th Annual Meeting of the American Association of Cereal Chemists will be held at the Nicollet Hotel, Minneapolis, Minnesota, May 23rd to 26th, 1944, inclusive.

A stimulating program has been planned with R. C. Sherwood of the Food Distribution Administration giving the address at the opening session on "Current Food Supplies and Requirements." Other phases of the industry to be covered are feeds, analytical methods, baking, and protein nutrition, with several papers prepared by experts for presentation on each subject.

Paint Club Officers Elected

At the annual election meeting of the Golden Gate Paint and Varnish Production Club, the following officers were installed for 1944: L. A. Thompson, National Lead Co., president; J. R. Hawkins, The Glidden Co., vice-president; F. J. Mendes, National Lead Co., secretary; W. Benson, R. N. Benson Co., treasurer.

Michigan Association Elects Officers

The new officers of the Allied Drug and Cosmetic Association of Michigan were installed at the last meeting at the Detroit Leland Hotel. The officers are as follows: E. E. Van Allsburg, Eccleston Chemical Co., president; Gordon Buck, Standard Oil Co., Indiana, vice-president; Maison G. de Navarre, Maison G. de Navarre Associates, secretary; Stewart Cowell; J. T. Baker Chem. Co., treasurer. The executive committee includes William M. Russell, Monsanto Chemical Co.; A. R. Vicary, Mark W. Allen Co.; A. S. Bedell, Beauty Counselors, Inc.; Donald Melville, Frank W. Kerr Co.

Corwin Appointed Chemical Director

Appointment of John F. Corwin as chemical director of the Casein Company of America is announced by William Callan, president of this division of The Borden Company.

Dr. Corwin was formerly director of research of the company's laboratories at Bainbridge, N. Y., when, in 1941 he was released to the O.P.A. to head its Resins and Plastics Section. He has recently been associated with the Plastics Division of the American Cyanamid Company.

As chemical director, Dr. Corwin will be in charge of research and chemical operations of the company, which manufactures casein and resin adhesives as well as other natural and synthetic products for industrial uses.

Electrochemical Society Honors Whitney

Dr. Willis R. Whitney, honorary vice-president of the General Electric Company and first director of its research laboratory, has been made an honorary member of the Electrochemical Society. A charter member of the organization and its president in 1912, Dr. Whitney was awarded the certificate of honorary membership from the Society's president, Dr. Robert M. Burns, on April 14, during the organization's meeting in Milwaukee.

One of Dr. Whitney's "most notable achievements in electrochemistry," a society statement said, "was his proposal of the electrochemical theory of corrosion which is now universally accepted as the basis of corrosion reactions."

According to this concept, which has permitted metallurgists to develop metals that resist corrosion and have proved of great value in war equipment, miniature electric batteries are formed along the surface of a metal. These are short-circuited and the flow of current from one area to another is responsible for corrosion or "rusting."

(*Continued from p. 694*)

back the sale of some commodity, or equipment, except as the sale conforms to U. S. policy: The prospective foreign purchaser, not getting what he wants from his American firm, turns to a supplier from another country, and is told he can get all he wants. That is now described as a situation of the past. Nevertheless, it has a bearing on the prospective close regulation of our foreign trade in the immediate post-war period.

Commerce Department Activities

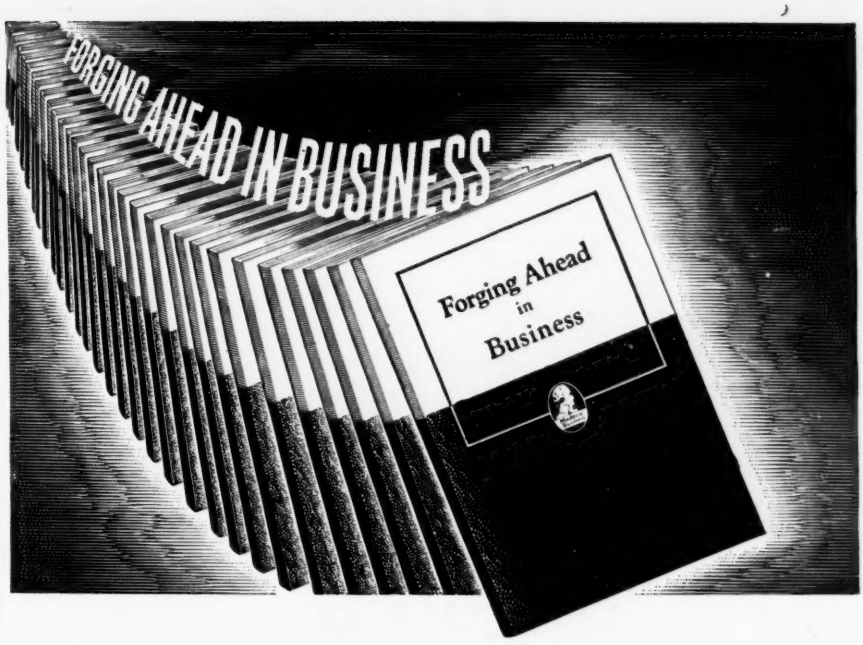
While it is hard to say, in the transition, where war activities of the various agencies leave off and those of post-war are launched, the Bureau of Foreign and Domestic Commerce is a case in point, and on the surface appears to be concerned with more constructive undertakings than some of those already mentioned.

This Bureau in the course of a year passes on some 50,000 foreign firms on which American exporting companies have asked a report before cementing business connections. Since the war this activity has served a double purpose of insuring that American goods did not get into the hands of Axis firms, and also to protect the American firm against a possible loss through involvement with a questionable receiving firm abroad. The multiplicity of lists of firms abroad, maintained by this government as an adjunct to regulating its overseas commerce under war requirements, have made such an advisory service of special importance. Such lists of course, are prepared and revised by the State Department, but other agencies are all concerned with them.

However, as an official of this Bureau has recently stated, while the work of the Bureau has been largely concentrated on war during the past year, and the year preceding that, nevertheless, "there has been a great deal of emphasis in the requests made of us, not only by the war agencies, but by private business itself, to the point where you could say that a great deal of attention has been given to what might be conveniently called post-war needs, or needs arising during the transitional period."

In approaching this phase of its responsibilities, the Bureau has revealed that it contemplates giving much broader statistical information, and economic background, both on domestic and foreign matters. Furthermore, it is seeking means to enable it to break such work down into industrial categories.

In the chemical field alone, the Bureau recognizes in this connection that there are numerous distinct subfields, which for the purpose of doing business need to be segregated. For analysis of foreign trade developments, the Bureau has asked additional funds for the coming year, looking to control of imports and ex-



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ports by the Board of Economic Warfare, as it was formerly known. The work would pave the way for future developments also.

(*Continued to p. 765*)

Chicago Rubber Group Meets

Chicago Rubber Group held a meeting on Friday, May 19, in the Terrace Casino of the Morrison Hotel. Dinner was at 6:30 P. M. At this meeting election of officers for the coming year took place.

The technical speaker of the evening was Ira Williams of J. M. Huber, Incorporated, who spoke on; "Production Problems and Uses of Various Synthetic Rubbers, the Difference Between the Various Synthetic Rubbers and Crude Rubber both in the Raw and Finished Products, and also the Possible Future Uses of Synthetic Rubbers."

Perfumers' Association Hears Chemical Warfare Officers

The Chicago Perfumery, Soap and Extract Association, at their March meeting, turned out in force to hear an exceptional program presented by Army and Navy officers on the subject of chemicals in warfare.

Through the courtesy of Col. Harry R. Lebkicher, Commanding Officer of the Chicago Chemical Warfare Procurement District, the program was directed by Lt. Joseph Schwimer, Public Relations Officer and chemical expert of that command.

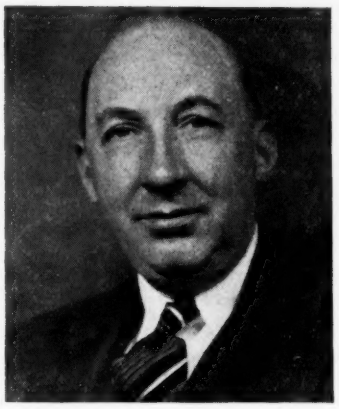
Others participating were Maj. N. H. Fritz, Chemical Warfare Officer of the Sixth Service command, Lt. (j.g.) Stanley Livingstone, a Chemical Warfare Officer at Great Lakes Naval Training Station and Warrant Officer Jas. B. Powers from Great Lakes.

Bulletin Prepared for Paint Industry

Announcing their plans for a series of important market studies to aid the paint industry in the practical program it has undertaken, the postwar planning committee of the National Paint, Varnish and Lacquer Association calls attention to the title selected for the reports. "Looking Toward Tomorrow" is the name chosen for the bulletin, which will have an accrued valuation in the days when "postwar" is an accomplished fact.

"Looking Toward Tomorrow" will be of benefit to manufacturers of both industrial and structural products in serving as a guide post to practical planning by the individual manufacturer.

Brayman Succeeds Joslin



The appointment of Harold Brayman to be Director of the Public Relations Department was announced recently by E. I. du Pont de Nemours and Company. He succeeds the late Theodore G. Joslin, who died suddenly April 12. Assistant director of the department since 1942, Mr. Brayman was a Washington correspondent and columnist before joining the company.

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U.S.I. CHEMICAL NEWS

May ★ A Monthly Series for Chemists and Executives of the Solvents and Chemical Consuming Industries ★ 1944

Alkyd Allocations Tightened Further

New Resin Specifications Can Be Met with Other U.S.I. Products

Heavy military demand for certain products requiring phthalic anhydride in their manufacture have necessitated a reduction in the amount of this chemical allocated for use in alkyd resins. Thus it is predicted that alkyd resins will be allocated only for the most critical end uses.

Maritime Commission

The Maritime Commission is reported to have given notice that after May 1st the use of alkyd resins will be permitted only in their interior and exterior primers and in their low visibility exterior paints. S&W Aroplaz 1244, U.S.I.'s 52-MC-21 resin, will, therefore, still be allowed for use in Maritime Specifications 52-MC-23 and 52-MC-29 primers and S&W Aroplaz 1328 for use in MC-52-A1, Class XXII, red lead primer. S&W Aroplaz 1240, the 52-R-13 resin, will also still be allowed for use in exterior finishes such as Specifications 52-MC-5 and 52-MC-6. However, the majority of interior finishes will be based on an oleoresinous vehicle meeting requirements of Specification 52-MC-7. Arochem 365 is recommended for use in the compounding of this vehicle.

Armed Services

As a conservation measure, the Armed Service Forces also are revising many of their coating requirements. Many types of equipment such as tool kits, first-aid kits, metal bins, tables, blitz cans, and other metal equipment, formerly finished with an alkyd primer followed by an alkyd finish coat, will now be finished with a single coat of Specification 3-181 enamel; olive drab, rust inhibiting. Aroplaz 1320 is the U.S.I. vehicle for use in this specification.

Other equipment such as wooden carrying equipment, desks, antenna masts, etc., formerly coated with one coat of each of Specification ES-680A, Classes 638, 101 and 204, will now be coated with one coat of ES-680A, Class 638 followed by a coat each of AXS-750 and AXS-752, semi-alkyd finishes. ES-680A, Class 638 can be formulated with U.S.I. Aroplaz 1323, while AXS-750 and 752 requirements can be met by the use of Aroplaz S-313 or a 50/50 blend of Aroplaz 1323 and a 20 gallon oil length Ester Gum C varnish.

The U. S. Navy Department Bureau of Ships is now considering the revision of their interior fire retardant paint Specification 52-P-22 to replace the alkyd with more available materials. No definite decision has been made on this as yet, however, so the 52-R-13 alkyd resin (Aroplaz 1240) will be the required vehicle until further notice.

Novel Anti-Freeze Use Protects Gas Pipe Lines

In the Louisiana natural gas fields, a pipe line company has installed alcohol injectors to guard against freezing of hydrates in the line, should the dehydration plant be out of service. About one gallon of alcohol per million cubic feet of gas is required to provide this stand-by protection.

Fast-Advancing Textile Field Steps Up Use of U.S.I. Products

New Finishing and Coating Processes Call for Ethanol, Acetone, Other Solvents and Chemicals

Wind- and water-proof materials for Arctic service, oil-proof fabrics for plane parts, shrink-proof socks for soldiers — these are but suggestions of how the products of a wide-awake textile industry are serving the war effort. Many of these new fabrics were developed to solve specific war problems, or to meet the shortage of rubber and other materials. With few exceptions, however, they are here to stay, despite the return of natural rubber and the lifting of other war restrictions.

Washable, dry-cleanable fabrics that remain water-proof and retain their soft handle will be standard for a wide range of clothing. Flex-resistant, non-flammable fabrics will upholster plane, train, and automobile seats. Crack-proof, leather-like cloth tippings will adorn shoes. Odorless, non-toxic cloth package liners will protect solid and liquid foods. Specialty textiles of almost limitless variety will contribute to the comfort, convenience, and economy of postwar living.

Application, Manufacture

In the application of many new textile coatings, such U.S.I. solvents as ethanol, acetone and ethyl acetate are indispensable. In the manufacture of the coatings themselves, dibutyl phthalate and other U.S.I. plasticizers and solvents play many essential roles. And, of course, in many of the older textile manufacturing and finishing processes, huge tonnages of U.S.I. products are consumed: acetone as the solvent in which Rayon and Vinyon are extruded; dibutyl phthalate for fiber lubrication; acetone and alcohol for making "fused" shirt collars and as degumming agents and dyeing assistants, etc.

That the field for further textile development is still wide open, however, is graphic-

(Continued on next page)

Uses Conduction Heating in Setting Plastic Glue

The use of high-frequency electric currents to *in*duce heat in hot-setting plastic glues, while relatively new, has reached a high state of development and is now much used in making plywood and other materials. A new development, however, is the use of *con*duction heating, as recently reported by a Canadian scientist.

There appears to be no limit in the size of wood which can be joined. And the time required is astonishingly short. Built-up wooden propellers, it is said, are "welded" in 5 minutes, an operation which formerly required 8½ days.

The plastic glue used in made electrically conductive by the addition of acetylene black which is said not to affect the strength of the joints.

Fog and Frost Preventive

A composition said to be effective in preventing the formation of fog and frost on windows, goggles and other glass surfaces has recently been patented. The patent covers the use of an alkali, ammonia, or organic base salt of a sulfated higher alcohol, and a water-soluble solvent such as a 10 to 1 ethanol-acetone mixture.

What a contrast in style the Yeomanette of 1918 and the 1944 WAVE present! The contrast in the textiles of which their uniforms are made is almost as great. The success of the textile industry in developing more serviceable, more suitable fabrics is reflected in wide range of war products—from uniforms to tank tarpaulins.

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May ★ **U.S.I. CHEMICAL NEWS** ★ 1944

Textile Field

(Continued from preceding page)

ally shown by a review of recent patents. Here are listed a few of the more interesting ones involving U.S.I. products:

Waterproofing

In the water-repellent coatings field, one patent describes the synthesis of such compounds as hexane-bis (*N*-octadecylamidomethylenepyrinidium chloride) and their application in ethanol solutions to impregnate cellulose textiles. Another covers a water-in-oil emulsion containing butyl alcohol, along with a solvent-soluble urea-formaldehyde condensate, solvent-soluble ethyl cellulose, a water-insoluble wax, and an aluminum soap.

A third patent in this field describes the dispersing in ether of a gel formed from a benzene or naphtha vehicle and an aluminum soap, and mixing with a volatile vehicle — for waterproofing felt hats. For both felt and straw hats, a patent awarded to the same inventors covers the dispersion of a similar gel by a peptizing agent such as acetone. A fifth important patent covers the use of an emulsion of an ester of a cellulose ethyl ether in volatile organic solvent, so as to leave an insufficient amount of impregnating material to form a continuous coating over the textile. In still a sixth patent, anhydrous ethanol serves as the reaction medium in the production of polyguanidines for improving the dyeing properties and water repellency of fabrics.

Shrinkproofing

The shrinkproofing of wool with alcoholic caustic potash, recently described in these columns, is another development of interest. Up to 65 percent reductions in the felting shrinkage of wool socks have been made without significant loss of strength.

Mothproofing

Numerous recent patents of mothproofing agents involve the use of U.S.I. solvents. One, assigned to the Government, is isonitrosoacetanilide in acetone solution, along with various other compounds.

Another patent calls for the use of butanol in a method for treating fibers to facilitate impregnation with fungicides. A British patent on laminated fabrics suggests ethanol as the solvent for the plasticizer. Two German patents for increasing the elasticity of acetate rayon describe a mixture of ethyl acetate and chloroform as the treating agent.

An American patent on the stabilization of knitted cellulose fabrics (to prevent shape distortion in use) employs a condensate of urea, formaldehyde and ethylene glycol or ethanol. Another on the treatment of airplane fabrics to prevent damage from gasoline, etc., names ethanol as one of the solvents for the film-forming agent; the fabric is shrunk into place on its mounting as the solvent evaporates. Dibutyl phthalate can serve as the plasticizer in yet another patent on the finishing of fabrics with ethyl cellulose — to impart soft handle and imperviousness to moisture and air.

Acetone Employed in Extracting Vitamin K

Alfalfa, chestnut tree leaves, and pig livers are used as the source of vitamin K in a process developed by a Russian scientist and recently reported in an English journal. The process involves the extraction of the vitamin with acetone and subsequent purification to remove colored substances and other unwanted constituents dissolved out by the acetone.

The extract is first heated and treated with petroleum ether and with 90 per cent methanol, and the methanol extract discarded. The ether fraction is transferred into alcohol and cooled to O C, and the resulting precipitate filtered out. The filtrate is then evaporated and the remainder treated with petroleum ether and 90 per cent acetic acid. Again the ether fraction is transferred into alcohol, cooled with "Dry Ice" and filtered. The fatty fluid resulting contains about 36 per cent of the vitamin K originally present in the starting material.

A. J. Wittenberg Resigns as Vice-President of U.S.I.

U. S. Industrial Chemicals, Inc. announces with regret the resignation, as of April 14, 1944, of Mr. A. J. Wittenberg, Vice-President of the Company and Director of the Stroock & Wittenberg Division.

Mr. Wittenberg joined the Company in 1938 when the Stroock & Wittenberg Corporation became a wholly owned subsidiary of U.S.I.

To further consolidate U.S.I.'s plans for expansion, development and diversification in the chemical field, the natural and synthetic resin business of Stroock & Wittenberg, with the same personnel and offices, was sometime ago made an integral part of U.S.I. and is being conducted in the name of U. S. Industrial Chemicals, Inc.

TECHNICAL DEVELOPMENTS

Further information on these items may be obtained by writing to U.S.I.

The unpleasant odor of cod and other fish liver oils, it is claimed, can be masked or effectively modified by a new product now being offered to manufacturers of cosmetics, etc. **(No. 809)**

U S I

A molasses distillers product, in liquid form and containing 45 per cent solubles, has recently been made available without allocation requirements. The product is claimed to have possibilities as a sticking agent or binder for various industrial uses. **(No. 810)**

U S I

Anti-corrosion films, for highly polished steel surfaces, can be obtained with a new product which is diluted with acid-free mineral oil and applied cold, according to the maker. The new coating is said to pass standard tests against hydrobromic acid, salt spray and humidity. **(No. 811)**

U S I

Ethyl chloroacetal is reported to be available in 1 to 12-gallon glass containers for use in organic synthesis and the preparation of medicinals. A stable, water-white liquid, the product has a boiling range of 150 to 158 F and mixes with most organic liquids. Not miscible with water, glycerol, and higher aliphatics. **(No. 812)**

U S I

A portable infra-red unit has been developed for making "on the spot" heating and drying tests of chemicals, plastics, coatings, etc. Supplies from 70 to 400 F, operates on a-c or d-c. **(No. 813)**

U S I

A new vitamin test kit is described as providing fast, accurate determinations of vitamin A in fish liver and other types of oils. Utilizes extremely sensitive colormetric reaction. **(No. 814)**

U S I

Cleaning Metal Surfaces, after magnafluxing, is said to be facilitated by a new solvent of neutral pH and negligible toxicity. The rate of solvent recovery being high, the product should provide an economical means of removing oil and dye to provide a clean surface for painting, rust-proofing, etc. **(No. 815)**

U S I

Stabilized dicalcium phosphate dehydrate, recommended by the maker for medicinal uses and as a mineral substitute for foods, or a polishing ingredient in tooth pastes, is announced. Product is reported to retain water of crystallization and to remain free flowing during long storage under abnormal conditions. **(No. 816)**

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Fall Conference for Textile Chemists Planned

The American Association of Textile Chemists and Colorists is making its plans for the annual convention to be held at the Claridge Hotel in Atlantic City, on October 12, 13 and 14. The arrangements are under the supervision of the Philadelphia section of the Association, whose chairman is Boyce C. Bond of the General Dyestuff Corporation.

Because of war time restrictions in travelling, this annual meeting will be devoted entirely to an appropriate technical program, including the annual intersectional contest. This will be the fifth contest which the association will hold and the various sections are now setting up local committees which will be charged with the preparation of a suitable technical paper for presentation on this occasion. Previous contests have produced contributions of considerable value to the textile industry.

Downs Elected Chemists' Club President

C. R. Downs, consulting chemical engineer of New York and Stamford, Conn., has been elected president of the Chemists' Club. He succeeds C. R. DeLong, chemical consultant of New York City.

A. G. Syska of the firm Kelly, Syska and Hennessy, is the newly elected Secretary and C. L. Knowles of the General American Transportation Corp. has been chosen resident vice president. New members of the Board of Trustees of the club are Carl Haner of the American Cyanamid Co., Frank S. Low of the Westvaco Chlorine Products, and J. G. Parks of the Standard Alcohol Company.

Dr. Downs is the recipient of the Howard N. Potts gold medal of the Franklin Institute of Philadelphia, and of the Grasselli gold medal of the American Section of the Society of Chemical Industry of London.

PERSONNEL

WPB Coatings Branch Changes Made

The resignation, effective May 31, of Thomas J. Craig, chief of the Protective Coatings Branch of the Chemicals Bureau, was announced by the War Production Board.

Mr. Craig will be succeeded as chief of the Protective Coatings Branch by Wells Martin, his deputy, who has been associated with the Protective Coatings Branch since April 1942. Mr. Martin resided in Chicago before coming to Washington, D. C.

Mr. Martin will also serve as chief of the Natural Resins and Naval Stores Section. He has had 25 years experience in the paint, varnish and lacquer industry.

Benjamin H. Belcher has been appointed deputy chief of the Coatings Branch to succeed Mr. Martin and will also continue to serve as chief of the Coatings Section, having supervision of the Paint, Varnish and Lacquer Unit, the Coated Fabrics Unit and two solvents units. He has been connected with WPB since April, 1942. He has had 10 years experience in the paint industry.

The Coatings Branch now consists of the following four sections: The Coatings Section, B. M. Belcher, Chief, Dr. Henry O. Farr, Assistant; Pigment and Color Section, Thomas P. Starkie, Chief, Charles Love, Assistant; Natural Resins and Naval Stores Section, Wells Martin, Chief; Synthetic Resins Section, Ralph T. Urich, Chief.

Clark Returns to Wyandotte

M. E. Clark, former manager of market research of Michigan Alkali Company, has returned to Wyandotte Chemicals Corporation as assistant director of technical service and manager of market research. Mr. Clark was granted a leave of absence in July of '41 at the request of the Office of Price Administration to accept special duties in Washington, D. C., where he later became Chief of the Program Section of the War Production Board.

Scull Manages Rubber Plant

W. W. Scull has been appointed manager of the synthetic rubber plant being operated at Port Neches, Texas, by The B. F. Goodrich Company for the government, it is announced by William I. Burt, general manager of plants of the company's chemical division.

Scull joined B. F. Goodrich in 1929, has had wide experience in the purchasing and sales branches of the company, and had been operations manager of the Port Neches plant since last July.

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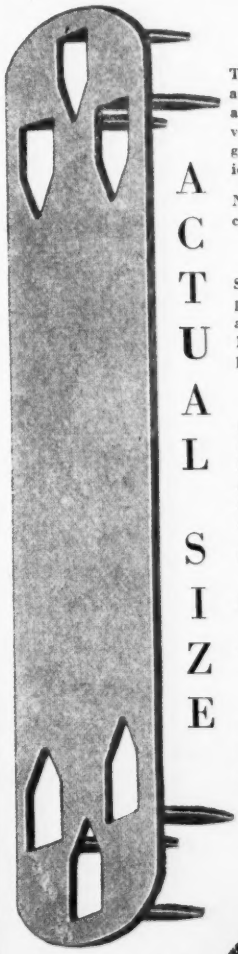

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Goodrich Personnel Announcements Made

John D. Beebe has been named manager of a new department, Rubber Suspension Sales, it is announced by E. F. Tomlinson, general manager, industrial products sales division of The B. F. Goodrich Company. The new department will have charge of sales of the company's Torsilastic rubber springs and its line of Vibro-Insulators, made of rubber and metal primarily for the elimination of vibration, rubber parts for street cars and devices for sound dampening.

Charles W. Staacke has resumed his duties as belting sales engineer for The B. F. Goodrich Company after many months on special war assignments as a civilian specialist on rubber problems, during which he had duty in North Africa, China, Australia, India, New Guinea, New Caledonia, the Solomon and Gilbert Islands in the Pacific.

Penn Salt Adds to Research Staff

Pennsylvania Salt Manufacturing Company announces the following additions to its research and development department staff:

Dr. R. D. Evans, formerly with New Jersey Zinc Company; E. A. Bruce of Blaw Knox Company; F. W. Jakob, recently discharged from the U. S. Army as first lieutenant and graduate of Pennsylvania Military College; J. L. Staubly of National Association of Dyers and Cleaners; J. M. Swales of U. S. Navy Inspection Department; J. J. McBride of Franklin Research Company; Miss Katherine Dilworth of Delaware County Hospital; and Miss Gertrude Schutze of National Broadcasting Corporation.

New staff members also include Miss Margaretta E. Aeugle of Duke University and Miss Gladys Molyneux of Cornell University.

Thomas Toovey, well-known pulp and paper specialist, has been transferred from sales service to the research and development department where he will have supervision of research and development work related to new and improved pulp and paper chemicals.

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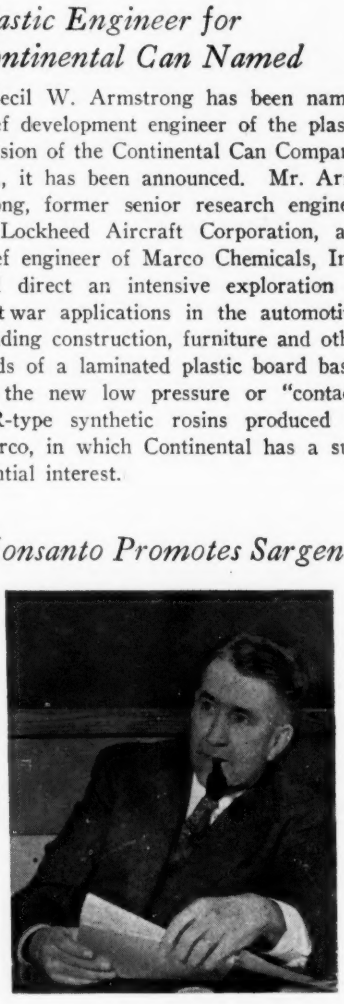
Plastic Engineer for Continental Can Named

Cecil W. Armstrong has been named chief development engineer of the plastic division of the Continental Can Company, Inc., it has been announced. Mr. Armstrong, former senior research engineer of Lockheed Aircraft Corporation, and chief engineer of Marco Chemicals, Inc., will direct an intensive exploration of post war applications in the automotive, building construction, furniture and other fields of a laminated plastic board based on the new low pressure or "contact" MR-type synthetic rosins produced by Marco, in which Continental has a substantial interest.

Monsanto Promotes Sargent



The appointment of Neil A. Sargent as assistant research director of the Merrimac Division of Monsanto Chemical Company has been announced by D. S. Dinsmoor, vice-president of the company and general manager of the division. Mr. Sargent will share administrative and supervisory responsibilities with A. H. Bump, also an assistant research director under W. S. Wilson, director of research.

Reichhold Promotes Reece

Henry H. Reichhold, founder, owner and chairman of the board of Reichhold Chemicals, Inc., Detroit, announces that at the April board of directors' meeting M. W. Reece was made vice president in charge of Pacific Coast operations.

In addition to having general managership of RCI's manufacturing plant at South San Francisco, Mr. Reece will also direct and supervise the activities of the company's branch offices in Los Angeles and Seattle, which are managed respectively by Frank E. Dillon and T. S. Hodgins.

Koppers Names Industrial Relations Manager

J. N. Forker, vice-president of Koppers Company, has announced the appointment of Edward Salner as manager of industrial relations.

Mr. Salner comes from Koppers Company, Bartlett Hayward division, Baltimore, where for five years he was assistant works manager. He was with the B. F. Goodrich Company, Akron, O., and chief of Job Analysis and Information Section of the U. S. Employment Service, Washington, D. C., before joining Koppers.

Allen Appointed to Seiberling Rubber Co.

The appointment of Dr. Raymond P. Allen to the development staff of Seiberling Rubber Co. was announced recently by H. P. Schrank, the company's vice-president in charge of production.

Dr. Allen will be assigned to development and study of improved cotton, rayon, nylon, and other fibers for use in tire carcasses, Mr. Schrank said. He pointed out that this extensive study of a comparatively unexplored field is made necessary by conversion to the use of synthetic rubbers in tire manufacture, requiring improved tire cord fabrics.

A former research chemist for the B. F. Goodrich Co., Dr. Allen has for the past three years been manager of the plastics division of the National Rubber Machinery Co. of Akron.

General Foods Adds to Staff

Dr. A. G. Olsen, manager of the General Foods Central Laboratories at Hoboken, N. J., announces the following additions to the laboratories staff;

Herbert S. Madsen, formerly assistant professor at the Oregon State Experiment Station, Corvallis, Ore., is now in the processing technology section.

Charles Overbeck, who was formerly with the Union Bag and Paper Corporation, has been added to the engineering research section.

Dr. Jacob R. Feldman has been made a member of the staff of the organic research section. He was with the U. S. Customs Laboratory, Philadelphia, Pa.

Martin Named Coatings Director

American Resinous Chemicals Corporation of Peabody, Mass., announces the association of Mr. Ray C. Martin with their company, as director of the Coatings Division.

Mr. Martin was previously associated with War Production Board in Washington, D. C., where he served with the Chemicals Bureau, Plastics Division. His direct responsibilities there were as consultant on cellulose plastics and in an administrative capacity on vinyl resins.

Townley Heads New Division

Formation of a new foreign division of American Home Products Corp. and election of Donald C. Townley as a vice-president in charge of the division was announced by Alvin G. Brush, Chairman of the corporation's Board of Directors. The move consolidates all foreign companies and export business into an oper-

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"K" rations for industry? As wartime emergencies gave birth to new materials, new formulas, new problems; as raw material sources for many widely used Essential Oils were cut off by enemy seizure and lack of "bottoms", the MM&R laboratories produced efficient emergency replacements.

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ating division on a par with five other operating divisions of the corporation, Mr. Brush explained.

The new foreign division of American Home Products Corp. will serve to unify, and provide a more efficient supervision over the corporation's export operations, its companies in England, Australia, New Zealand, South Africa, and Latin America. Approximately one-sixth of the corporation's business is in its foreign operations.

Present plans include setting up overseas operating departments, under the supervision of the foreign division, which will correspond to the five domestic operating divisions of the corporation. These are: pharmaceutical, biological, nutritional, and vitamin; household products; foods, cosmetics; and packaged drugs.

Other Personnel

CARL L. WALLFRED of the Batelle Institute, Columbus, Ohio, has been appointed as manager of the pilot plant department of Ansul Chemical Co., Marinette, Wisconsin.

WALTER P. ARNOLD, technical director of Koppers Company, Wood Preserving Division, was elected president of the American Wood-Preservers' Association at its fortieth annual meeting in Chicago, April 26.

Howard Joins Millmaster

Frank Howard has been appointed general manager of the Millmaster Chemical Company. Mr. Howard joined the company two years ago. He has been affiliated with the chemical industry for eighteen years, having formerly been connected with the General Chemical Corporation and Livingston & Southwarth, Inc.

EDWARD A. ULRICH who has been with the Niagara Filter Corporation, Buffalo, N. Y., for five years in sales and engineering posts, has been appointed to the newly created post of technical director. He will supervise engineering, experimental and research projects and postwar planning.

CARL H. POTTENGER, formerly in charge of adhesive and resin sales for the plastics division of American Cyanamid Company, has been named to the post of assistant sales manager of the plastics division, according to an announcement by C. J. Romieux, general manager of the division.

FRANK E. NABERS, now vice-president and general manager of the Gager Lime Manufacturing Company, has resigned to accept the position of vice-president in charge of engineering of the Southern Ferro Alloys Company of Chattanooga, Tennessee.

OBITUARIES

DR. JAMES BRODBECK, president and chairman of the board of the Society of Chemical Industry in Basle ("CIBA"), Basle, Switzerland, died suddenly, Sunday, February 20, at his country home in Gstaad, near Berne, Switzerland, at the age of 61.

JOHN C. BROOKS, vice president and director of Monsanto Chemical Company and general manager of its Plastics Division at Springfield, Mass., died on April 26.

DR. GUSTAVE P. METZ, aged 68, asso-

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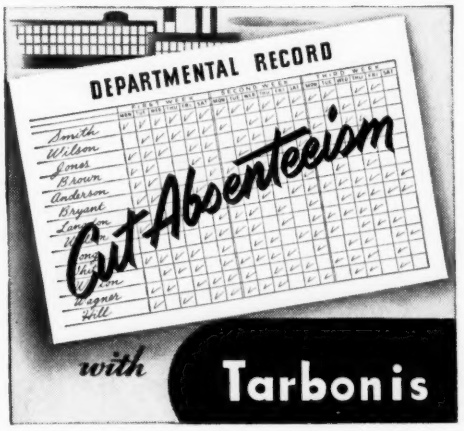

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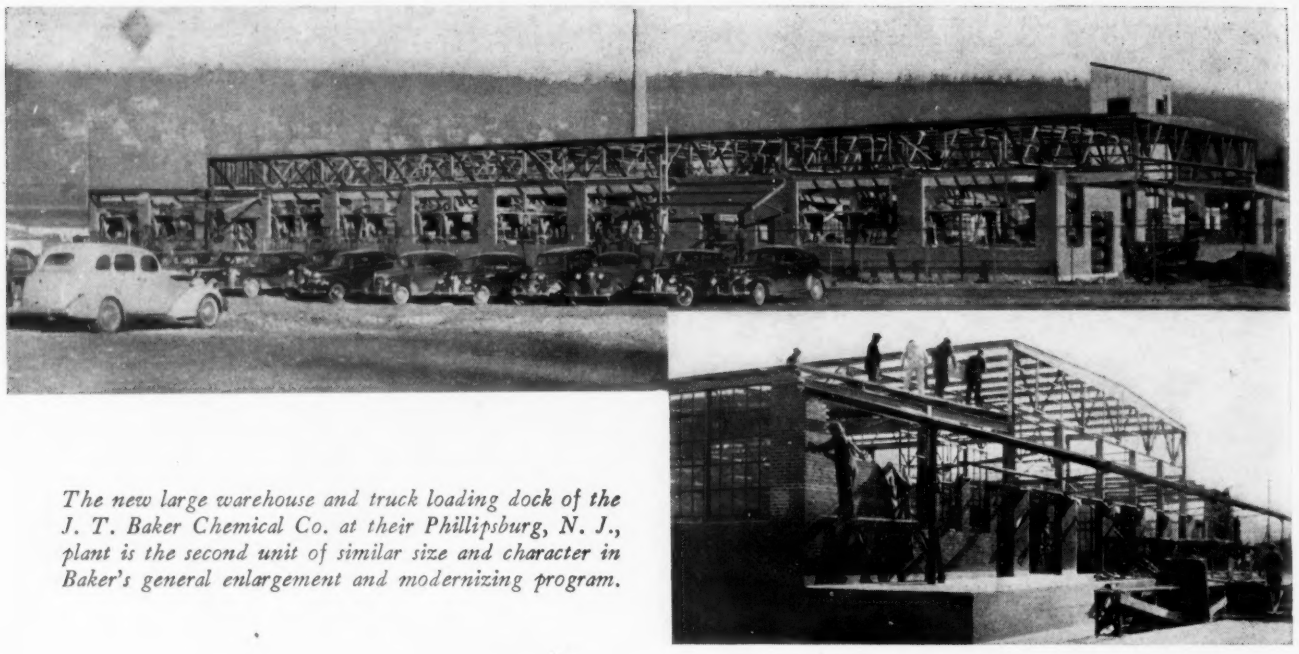
J. T. Baker Expands Facilities



The new large warehouse and truck loading dock of the J. T. Baker Chemical Co. at their Phillipsburg, N. J., plant is the second unit of similar size and character in Baker's general enlargement and modernizing program.

ciated with Winthrop Chemical Company since 1926 and brother of the late Herman A. Metz, former comptroller of the City of New York, died at his home in Albany April 7, after a long illness. He had retired two years ago as assistant to the manager of the Bayer-Winthrop manufacturing plant at Rensselaer, N. Y., a post he had held since 1931.

MENNO A. VESPER died in New York City on April 2, at the age of 64. He had joined Merck and Co., Inc., in 1925 and subsequently was appointed Director of the Field Sales Division, the position which he held at the time of his death.

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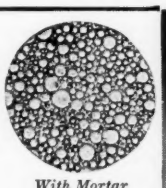

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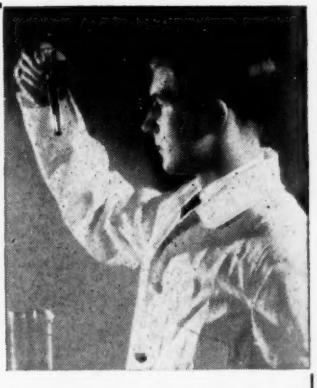

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NEWS OF SUPPLIERS

BRILL EQUIPMENT COMPANY, machinery dealers, are moving their offices and warehouse from 183 Varick Street where they have been for the past twelve years. The new offices will be located at 225 West 34th Street, N. Y., and the new warehouse and shop will be located at 2401 3rd Avenue, Bronx, N. Y.

CARRIER CORPORATION, Syracuse, N. Y., manufacturers of air conditioning, refrigerating, and heating equipment, has announced the addition of Dr. William A. Pennington to the research staff of its Engineering Division which is headed by vice-president Herbert L. Laube.

Dr. Pennington will devote himself to Carrier's metallurgical and chemical problems, including a number of research projects connected with the company's preparation of new and redesigned products for the postwar period.

Al J. McCullough and Jack E. MacConville have been placed in joint charge of industrial instrument sales for the **BROWN INSTRUMENT DIVISION** of the **MINNEAPOLIS-HONEYWELL REGULATOR CO.** at its Cleveland, Ohio, office. Kentner L. Wilson has been named branch manager of the **MINNEAPOLIS - HONEYWELL REGULATOR CO.** Detroit office. His appointment became effective April 1st.

FARREL-BIRMINGHAM COMPANY, INC., of Ansonia, Connecticut, and Buffalo, New York, announces the appointment of Albert P. Leonard as manager of its New York office to succeed Edward S. Coe, Jr., who has been transferred to the main office at Ansonia as assistant to the plant manager. The company is also moving its New York office from 79 Wall St., where it has been located many years, to 3700 Chrysler Building.

The **VOTATOR DIVISION** of the **GIRDLER CORPORATION** announces the May 1 opening of a New York office at 150 Broadway with S. N. Welch as the eastern representative.

THE THERMEX DIVISION of the **GIRDLER CORPORATION**, Louisville, Kentucky, announces the May 10 opening of a New York office, 150 Broadway, with Hugh Cameron as eastern representative.

Hiland G. Batcheller, president of **ALLEGHENY LUDLUM STEEL CORPORATION** has announced the appointment of R. H. Thielemann as development engineer for the company. Mr. Thielemann, the author of several technical papers on metallurgy, was formerly associated with the research laboratory of the General Electric Company at Schenectady, New York.

The Chicago sales offices of the Amercoat Division of **AMERICAN PIPE AND CONSTRUCTION CO.**, Los Angeles, California, occupies new quarters in Suite 341, McJunkin Bldg., 4554 N. Broadway, Chicago, it has been announced by R. A. Glasgow, general sales manager, who will make his headquarters there.

William D. Turnbull, who has been vice-president and sales manager of the **POMONA PUMP COMPANY** of California, has been appointed manager of the **WESTINGHOUSE ELECTRIC AND MANUFACTURING COMPANY** Agency and Specialties Department.

INDUSTRIAL TRENDS

The following industrial activity was reported for the week of April 28.

ELECTRICITY: Electric power production rose from 4,307,498,000 to 4,344,188,000 kilowatt-hours.

STEEL: Steel ingot operations increased from 99.5 to 100 per cent of capacity, a tonnage rise from 1,782,300 to 1,791,300 tons; another new peak.

OIL: Daily crude oil production declined from 4,432,150 to 4,427,350 barrels.

COAL: Coal output increased from 11,730,000 to 12,230,000 tons.

COMMODITIES: Continuing the irregular fluctuations of the past few weeks, commodity prices were fractionally lower. The Dun & Bradstreet daily wholesale index of 30 basic commodities declined from 172.49 to 172.17. The wholesale food price index dropped 1c to $4.02.

METALS: Rising war requirements accounted for the peak output in many other strategic metals. Zinc and lead production was reported even with the high level of 1943. Shipments of brass wire are at a peak but unfilled orders continue to mount. Mica output was well sustained although shortages exist in some high grade types.

PAPER: The increasing tightness in supplies of paper bags and containers has adversely affected many industries. Paperboard production was up 10 per cent, and while a moderate decline occurred in new orders, unfilled orders remaining were reduced by only 4 per cent. Paper mill operations were off in the week to 85 per cent of capacity.

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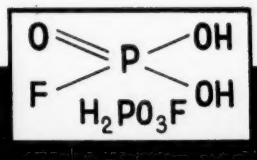

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WAR REGULATIONS SUMMARY

COAL TAR CRUDES—Crude light oil and crude materials containing tar acids or tar bases are exempted from price control effective May 15. G.M.P.R. Rev. Sup. Reg. No. 1, Amendment 55.

DIPENTENE—Placed under monthly allocation with small order exemption of five gallons per month. General Allocation Order M-300.

ESSENTIAL OILS—Price ceiling of $2.25 per lb. established for producers' sales of oil of decarleaf and oil of spruce. Dealers' ceilings range from $2.65 to $3.34 per lb., depending on size of container.

GENERAL—Metallic sodium, styrene, polystyrene, glycol, acrylic monomer and acrylic resin have been placed under General Allocation Order M-300 and the individual allocation orders revoked. The transfer involved raising the small order exemption for triethylene glycol from 250 to 600 lbs., and for mixed glycols from 250 to 1,000 lbs. The new order also provides for submission of a customer's use certificate in place of Form PD-600, formerly required, for certain intermediate quantities of glycols above specified exemptions.

GENERAL—The following chemicals are now covered by General Allocation Order M-300: formaldehyde, paraformaldehyde, hexamethylenetetramine, pentaerythritol.

ISOPROPYL ALCOHOL—Placed under General Allocation Order M-300. Order M-168 revoked.

LINSEED OIL—Restrictions on amounts that may be included in various types of protective coatings have been relaxed by an amendment to Order M-332. This has been made possible by the easing of the linseed oil situation, according to W.P.B., making it possible to allocate 60% of the quota at the present time as compared with 50% during most of 1943.

OILS—Coyol oil, chia seed oil and garcia mutans oil, three imported oils not previously common in trade in this country but now introduced to offset shortages of other imported oils, have been assigned the following price ceilings: coyol, $11.10 per lb., chia seed, 24c. per lb., and garcia nutans, 39c. per lb. These oils are similar to babassu, perilla and tung oil respectively.

PINE TAR—Placed under monthly allocation, with small order exemption of five gallons per month, effective May 1. Producers of less than 500 gallons per month also exempted. General Allocation Order M-300.

PYRONATE (pyroligneous alcohol denaturant)—Placed under allocation control, Order M-340.

STYRENE DERIVATIVES—Dichlorostyrene and polychlorostyrene have been placed under allocation control, effective June 1.

Marathon Acquires New Plant

The Marathon Paper Mills Company has acquired the plant of the Hoskin Paper Company, Menominee, Michigan, effective April 1. The Hoskin company's existing sales and purchase contracts are assumed by Marathon, subject only to government regulation. The mill now will be known as the Menominee Division of Marathon Paper Mills Company, and R. A. Hoskin, president and general manager of the Hoskin company is retained as resident manager of the mill.

Operation of the plant will continue as heretofore except such changes in manufacturing and sales policy as shall be made necessary by future government directives.

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NEVINDENE*
"G" RESIN
"R" RESINS

COUMARONE and MODIFIED COUMARONE RESINS

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Pentahydrate Sodium Metasilicate. Cowles CRYSTAMET is an exceptionally pure, perfectly white granular sodium metasilicate with the normal 42% water of crystallization. Excellent solubility, uniformity, chemical stability.

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Anhydrous Sodium Metasilicate. Cowles DRYMET is the most highly concentrated, most economical form of sodium metasilicate available. DRYMET contains no water. Yields nearly twice the chemical strength of hydrated sodium metasilicate at a substantial saving. Completely soluble, non-caking, easy to handle.

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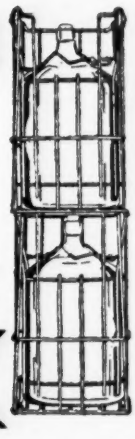

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CHEMICAL SPECIALTIES NEWS

New Metal Cleaner Aids in Spot Welding

A new method for rendering aluminum surfaces chemically and metallurgically clean in preparation for spot welding, is announced by Turco Products, Inc. of Los Angeles and Chicago. Turco Vulco-Etch is a chemical bath which frees aluminum alloy surface of oxides, corrosive salts, and tenacious grease and oil films.

Consistent, strong spot welds cannot be obtained if the aluminum surface is oxidized, oily or contaminated with corrosive salts. Vulco-Etch lays the foundation for sound spot welding by assuring a chemically and metallurgically clean surface. Cleaning and etching are accomplished in a 5 to 20-minute dip in the Vulco-Etch solution. Unheated wood-lined, rubber-lined or crockery tanks are used. The material rinses freely in fresh, cool running water. The Vulco-Etch solution is long-lived, and may be used for months without change.

Taggart Named Director

Matthew F. Taggart, director of research for the O'Brien Varnish Co., South Bend, Ind., was elected a director of the National Farm Chemurgic Council at its tenth annual meeting in St. Louis, Mo., March 29-31. Mr. Taggart has specialized in the development of chemical treatments for making soybean oil satisfactory for use in paint products.

Chapman Heads New Du Pont Plant

George L. Chapman, area supervisor of the Grasselli Chemicals Department plant at East Chicago, Ind., has been named superintendent of the recently-purchased insecticide plant at Tacoma, Wash., it has been announced by E. I. du Pont de Nemours & Company.

The Tacoma plant was purchased by Du Pont, April 21 from the Latimer-Goodwin Chemical Company of Grand Junction, Colo.

Household Insecticides Scarce

Householders should use spray guns with extraordinary care this year, the War Production Board reports. Against an Office of Civilian Requirements estimate that 5,000,000 would be needed in the first half of 1944, enough metal (468.6 tons) has been made available to six companies to make 3,200,000. Furthermore, there is no certainty that all of these will be turned out.

In addition, civilians this year will have less pyrethrum—the active ingredient in many insecticides. Officials explained that the demands of the services for pyrethrum for use in the control of malaria are increasing steadily.

These reports on insect control were presented at a meeting of WPB's Household and Industrial Insecticide and Disinfectant Manufacturers Industry Advisory Committee. Container simplification and standardization and manpower problems also were dsicussed.

Waterproof Paper Developments

The fabrication of ordinary kraft paper fortified with a waterproof asphaltic compound during a process of creping the material on both diagonals which cross in the form of an "X" supplying a waterproof, "two-way stretch" is the chief reason for awards of the Army-Navy "E" at the Cincinnati Industries, Inc., on March 31.

As result of the diversified war uses of the "X-Crepe" material and further applied development since the war started it has been reported that human lives have been preserved through safe and intact arrival of "X-Crepe" packaged plasma and medical supplies despite unusual circumstances of sea and swamp.

Huge bundles of clothing, foodstuffs, cigarettes and a variety of other military supply items that are packaged within the protecting "waterproof armor" of the Cincinnati-made material reach fighting fronts intact and usable.

One of the company's war-time products known technically as the "Submerso-Pak," but familiarly designated as "the Cincinnati bag," has developed into such a vital utility for protecting war supplies, that one entire plant of the company is devoted exclusively to production of this specialty.

Plastic Salt Tablet Container

A new handy container for salt tablets is made of non-inflammable crystal clear plastic. It is moisture proof and heat resistant keeping tablets in perfect condition. Containers are practically unbreakable and will last indefinitely. The United States Safety Service Co. of Kansas City, Mo., who manufacture the containers sell them filled with 8 "PEP-UP" salt tablets. These tablets are enteric coated to guard against "salt sickness" and heat fatigue.

New Industrial Cleaners Developed

Two new emulsion type cleaners have been announced recently by Pennsylvania Salt Manufacturing Co., Philadelphia. The first is a solvent emulsion cleaner, Pennsalt E. C. No. 10, which is said to combine soap emulsifying action with solvent penetration. Its suggested uses are for cleaning metals. The other cleaner, a concentrate type emulsion cleaner, Pennsalt E. C. No. 2, is recommended for industrial grease cleaning applications. It is soluble in water and in hydrocarbon solvents.

Goodrich Markets New Protective Creams

The name Clad has been given to a line of protective skin creams, developed in its chemical laboratories, it is announced by The B. F. Goodrich Company. Clad is made in two types, for dry and for wet working conditions.

The dry cream is of an improved type which has been made as nearly neutral to the skin as possible. These properties eliminate skin drying or any tendency to cause burning or irritation even under prolonged usage.

Use of the dry cream protects exposed portions of the body against dirt, grease, grime and other hard-to-wash-off substances. The company claims that it provides maximum protection and safety.

Need Synthetic Wax with a High Melting Point?
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Properties of ACRAWAX C

Color and Form	Hard, brown wax
Lustre	High
Melting Point	137-139° C.
Flash Point	285° C. (open cup)
Specific Gravity (25° C.)	0.975
Specific Gravity at M. P.	0.83

SOLUBILITY

Water	Insoluble
Alcohol	Insoluble
Naphtha	Complete (hot)
Toluol	Complete (hot)
Turpentine	Complete (hot) Gels on cooling

ACRAWAX C Is Compatible With:

Paraffin wax, carnauba wax, candelilla wax, rosin.

It is also compatible and easily used with any of the following: Rubber, burgundy pitch, ethyl cellulose, tallow, acrylic resins, polystyrene and chlorinated paraffin.

Among Its Many Uses Are These:

Because of resistance to steam and high pressures plus its excellent lubricating qualities, ACRAWAX C makes an ideal impregnating agent for flax mechanical packings.

As a mold lubricant in manufacturing plastics or sintered bearings of metallic powders, ACRAWAX C keeps the finished bearing from blocking, sticking in the mold.

ACRAWAX C, used with plastics as a protective coating in welding electrodes for underwater use, is resistant to salt water, protects welding coatings.

As a coating on paper or with textiles, ACRAWAX C decreases moisture permeability, resists boiling water.

Ink and paint manufacturers find ACRAWAX C improves pigment suspension.

ACRAWAX C, added to marine paints, lacquers, varnishes, resists the effects of salt spray.

Optical Lens manufacturers use ACRAWAX C to seal out air, moisture, dust.

Other uses include: ACRAWAX C with asphalt melts to increase the flow point without raising the brittling point; ACRAWAX C as a candle wax ingredient gives candles a non-drip quality; ACRAWAX C makes "Koroseal" more acid-resistant.

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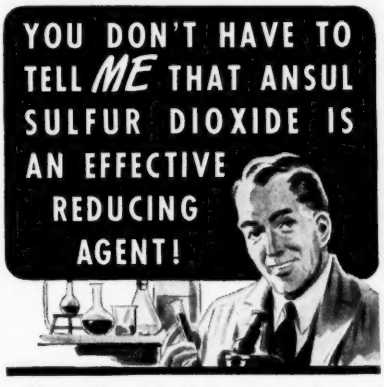

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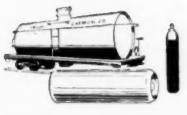

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Both the wet and dry types leave the skin soft and smooth even after the cream is removed. Both have been constantly tested under regular operating conditions in the company's factories, with many gallons being used each week by employees.

The dry type cream is finding wide general household usage, in addition to its industrial applications.

Industrialists report that use of protective creams, while not as effective as rubber gloves, greatly assists workers to reduce hazards from dermatitis and reduces "wash-up" time. This is especially true of the newer workers being drafted from the home and from the white collar groups into industrial plants, who find it necessary to protect hands and other exposed parts of the body against working conditions not previously encountered.

Pebble Finish for Metal Surfaces

The research laboratories of The Sherwin-Williams Company, producers of industrial coating materials, have recently developed a new "pebble" finish for machine tool surfaces which is claimed to use far less finishing materials and can be applied in one-third to one-half less time.

Called a "pebble" finish because of its physical appearance, this new method of protecting machine tool surfaces provides a successful solution to the problem of how to "dress up" a machine surface without fillers, sanding and numerous coats of sealing paint. WPB officials, in an effort to boost tool output, have prohibited the use of fillers, sealers and similar finishing materials, have also restricted the number of coats of paint that could be applied. With the new method, however, it is now possible to finish a machine tool in three operations instead of seven as formerly required.

Protects Food Against Mold

Production of "Mycoban" propionate salts, inhibitor of molds and "rope" that waste an estimated annual total of $100,000,000 in breads, cheeses, butter, and other foodstuffs, is being increased, according to an announcement of the Du Pont Co.

About 95 per cent of the yearly output of the salts goes into bread. Mixed in the dough before baking, the inhibitor is said to increase the span during which a loaf of bread will remain mold-free, appetizing, and tasty.

Propionates occur naturally in dairy products. They are present in detectable proportions in cheeses, being found in concentrations of approximately one per cent in some Swiss cheese, which thus is forearmed by nature with mold resistance.

Tests have shown that two or three ounces of the manufactured retardant per hundred pounds of flour for white breads, and about 50% greater amount for dark bread flours, are adequate protection. As used for cottage and cream cheeses, it is incorporated in the mix. Butter is protected by wrappers saturated with the salts in solution.

Taste tests have indicated it cannot be detected by the palate. Texture, appearance and aroma of foods remain unchanged by the retardant.

Lawrence Heads Company

Howard C. Lawrence who has been elected president of the Grand Rapids Varnish Corp., Grand Rapids, Mich., has been a director of the company for more than 20 years.

Cummer Expands Production

The Cummer Co. division of Sterling Drug, Inc., producing Energine cleaning fluid, shoe white, window cleaner and lighter fluid, is planning to produce additional products now under consideration. The program is scheduled to follow removal of the manufacturing plant and executive offices of Cummer from Bedford, Ohio, to Brattleboro, Vt., where larger facilities will be available.

O. J. Nickel has been appointed sales manager and Michael J. Cullinane advertising manager, James M. Cooke, divisional vice-president of the company announced.

For Dermatological Bases

Two emulsions for carrying medicaments for skin treatment are included in the new "Manual for Dermatology" (W. B. Saunders Co., Philadelphia) prepared under the auspices of the National Research Council by dermatologists Pillsbury, Sulzburger and Livingood. The first of these two ointment bases, a medium emulsion, yields a fairly firm product which carries sulfonamides and other medicaments. It consists of:

	Gm. or cc.
Sodium bezoate	0.1
Spermaceti	10.0
Sodium lauryl sulfate	1.0
Steary alcohol	10.0
Cetyl alcohol	3.0
Glycerine	10.0
Water	65.0

The second, a thin emulsion base, is somewhat softer. It is particularly useful in hairy regions and for applying medicaments to burns and other tender areas. It is made from:

	Gm. or cc.
Sodium benzoate	0.1
Cetyl alcohol	20.1
Sodium lauryl sulfate	1.0
Glycerine	10.0
Water	64.0

Both of these emulsion bases are prepared as follows: Heat the water, glycerine and sodium lauryl sulfate. Melt the lipoid ingredients separately. Mix the two thoroughly and continue mixing until the mixture is cool.

Versatile Glycerine

In a symposium on industrial dermatoses (New York State J. Med. 42:1525, 1942) Dr. Louis Schwartz of the United States Public Health Service pointed out that cellophane or regenerated cellulose can be plasticized with glycerine to form a pliable film capable of being made into protective clothing for workers. Such cellophane, he observes, is not affected by petroleum solvents or acids and also provides protection against war gases.

However, cellophane is hardened by water and it is also inflammable. But these disadvantages may be overcome in the manufacturing process by treating it with ammonium sulfamate to render it flameproof, and by coating it with a resin which makes it waterproof.

Heavy Use of Soap in Synthetic Rubber

Huge quantities of soap are being used in the manufacture of synthetic rubber, according to Roscoe C. Edlund, manager of the American Soap and Glycerine Producers. In a memorandum to the industry he reports that earlier estimates that about 100,000,000 pounds of soap would be required annually for this purpose are borne out. The estimate is confirmed, he says, by the latest reports from the Federal Rubber Reserve Company. Mr. Edlund further estimates that on the basis of six-hundredths of a pound of soap for each pound of Buna-S rubber, the tires and spares of a two-and-a-half-ton eight-wheel truck carry thirty-one pounds of soap, and a ten-ton pontoon bridge uses 192 pounds.

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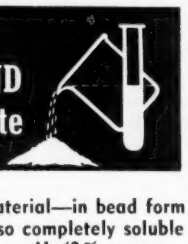
Chemicals for Industry

"BEMUL"—BEACON BRAND of Glyceryl Monostearate



CHARACTERISTICS: A Pure white, edible material—in bead form . . . is completely dispersible in hot water . . . also completely soluble in alcohols and hydrocarbons (hot) . . . has a pH (3% aqueous dispersion at 25° C.) of 9.3 to 9.7 . . . melts at 58 to 59° C. (Capillary Tube) . . . is non-toxic and practically odorless.

SUGGESTED USES: As an emulsifier in the manufacture of cosmetics, pharmaceuticals and food stuffs (including paste emulsions of edible oils, shortenings, etc.) . . . as a protective coating for Edible Hygroscopic Powders and similar crystals and tablets (and even fresh fruit and vegetables) . . . as a pour point depressant for lubricating oils . . . as a lubricant for paper and cardboard in dry die-forming . . . as an emulsifying agent in the polymerization of synthetic rubber . . . as a protective anti-oxidant coating for metals . . . as a preliminary binder for clays, abrasives, etc., . . . as a general emulsifying or thickening agent . . . as a suspending agent for organic or inorganic materials in aqueous solutions.

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World Rayon Production

Although little or no information has been available on rayon production in foreign countries since the beginning of the war, the *Rayon Organon*, publication of the Textile Economics Bureau, has attempted to meet the demand for information of this nature by estimating the combined production of rayon filament yarn and rayon staple fiber by countries. Some of the figures represent actual production records, while others are estimated based on the most accurate trade information available. Sources of data used are given in the table footnotes.

Based on these figures, world total rayon production increased from 2,227,500,000 pounds in 1939 to 3,472,900,000 pounds in 1942, a gain of 56 per cent, thus attaining an unprecedented high. The two countries contributing most to this increase were Germany with a gain of 480,000,000 pounds and the United States with an additional 252,700,000 pounds. These two countries together account for 732,700,000 pounds or 59 per cent of the 1,245,400,000-pound increase of 1942 over 1939. The increase in both cases is due to the greater demands on the fiber for replacement purposes, in Germany's case because of the shortage of the natural fibers due to war and blockade and in the case of the United States due to the replacement of silk, nylon and wool for civilian purposes and for additional war requirements such as tire cord, bomb parachutes, self-sealing gas tanks and similar uses.

Filament Yarn and Staple Fiber Increase

Of the 1942 world total production, 1,447,200,000 pounds was filament yarn and 2,025,700,000 pounds was staple fiber. In the case of filament yarn, there was an increase of 26 per cent from 1,145,490,000 pounds in 1939 to 1,447,200,000 pounds in 1942. Half of this 301,800,000-pound increase occurred in the United States, which recorded a gain of 15,700,000 pounds. The remaining 151,100,000-pound increase is distributed among the remaining countries in varying proportions. It is interesting to note, however, that Great Britain did not share this general increase but showed instead an estimated decline, attributable to war dislocations.

Production of rayon staple fiber increased 87 per cent from 1,082,100,000 pounds in 1939 to 2,025,700,000 pounds in 1942. This improvement occurred primarily in Germany, Italy, France and the United States, although as in the case of filament yarn, all countries excepting Great Britain shared the increase. In the case of the first three named countries, however, Lanital (casein wool) was included in the 1942 production while in 1939 it was not. This of course distorts the increase although it is to be expected that these Axis-controlled countries would show considerable development in the staple fiber field due to the required replacement of wool and other natural fibers which are practically unobtainable as far as these countries are concerned. In the case of the United States where the figures are comparable, however, the 1942 poundage was three times the 1939 production.

The United States produces more filament rayon yarn than any other single country, manufacturing 20 per cent of the world's total in 1939 and 33 per cent in 1942. Filament rayon yarn manufacturing countries ranked according to their volume importance for both 1939 and 1942 are as follows: United States, Japan, Germany, Italy and Great Britain.

Ranking the countries producing staple fiber according to volume importance, the following order is shown for 1939: Germany, Japan, Italy, Great Britain and the United States. The 1942 array is slightly altered; Germany, Japan and Italy continued to lead but the United States advanced to fourth place from the fifth,

Estimated World Rayon Production

(In Millions of Pounds)

	1939			1942		
	Filament	*Staple*	*Total*	*Filament*	*Staple*	*Total*
Europe						
Germany a	171.0	449.0	620.0	220.0	880.0b	1,100.0
Italy	119.0	191.0	310.0	132.0	330.0b	462.0
France	56.2	15.5	71.7	69.5	128.0b	197.5
Belgium	13.0	2.5	15.5	17.6	17.6b	35.2
Netherlands	24.2	..	24.2	26.5	11.0	37.5
Norway	0.4	..	0.4	1.0	none	1.0
Hungary	0.1	..	0.1	1.5	none	1.5
Rumania	2.7	0.1	2.8	4.4	7.7	12.1
Finland	0.5	0.6	1.1	1.1	7.7	3.3
Sweden	2.1	2.3	4.4	3.3	6.6	9.9
Switzerland	11.7	0.1	11.8	13.2	22.0	35.2
Spain	3.0	..	3.0	8.8	19.8	28.6
Great Britain	120.0	60.0	180.0	90.0	45.0	135.0
Greece	0.7	..	0.7	1.0	..	1.0
Portugal	0.4	..	0.4	0.5	..	0.5
Russia	17.0	..	17.0	30.0	..	30.0
Total Europe	542.0	721.1	1,263.1	620.4	1,469.9	2,090.3
North America						
Canada	14.2	..	14.2	18.5	..	18.5
Mexico	..	..	..	0.5	..	0.5
United States	328.6	51.3	379.9	479.3	153.3	632.6
Total North America	342.8	51.3	394.1	498.3	153.3	651.6
South America						
Argentina	5.8	..	5.8	8.3	..	8.4
Brazil	15.1	0.2	15.3	17.0	2.5	19.5
Chile	..	..	..	1.0	..	1.0
Colombia	0.2	..	0.2	1.2	..	1.2
Total South America	21.1	0.2	21.3	27.5	2.5	30.0
Asia						
Japan	239.3	309.5	548.8	300.0	400.0	700.0
Turkey	0.2	..	0.2	1.0	..	1.0
Total Asia	239.5	309.5	549.0	301.0	400.0	701.0
World Total	1,145.4	1,082.1	2,227.5	1,447.2	2,025.7	3,472.9

Source: 1939 Data is from the June 1941 *Organon*, pages 90-91. We believe this "pre war" data to be quite reliable.

1942 Data. For the European countries, Germany to Spain inclusive, the data are from the Textile Unit, Bureau of Foreign and Domestic Commerce, United States Department of Commerce; the Unit emphasizes that the data are estimated based on the most reliable information obtainable, but that the figures cannot be guaranteed. Other countries data are estimated by the Textile Economics Bureau. Data for Great Britain estimated at 75 per cent of the 1939 rate. Figure for Russia is a pure guess. Data for United States and Canada is actual. Data for South American countries reasonably accurate, based on trade information. Japanese data a pure guess based on capacity operation of the industry previously reported in the 1937-38 period.

a Data for Germany includes Austria, Poland and Czechoslovakia.

b Lanital (casein wool) included for Germany, France, Italy and Belgium.

France came in as fifth, and Great Britain dropped to sixth in rank. As a staple fiber producer, the United States manufactured only 8 per cent of the world's total in 1942, while first-ranking Germany manufactured 43 per cent of the world's supply.

Arranging the countries according to their total rayon production for 1942, Germany is shown leading with 1,100,000,000 pounds (32 per cent of the total), Japan second with 700,000,000 pounds (20 per cent of the total), and the United States making a close third with 632,600,000 pounds (18 per cent of the world total). The three countries together accounted for 70 per cent of the total world rayon production, over half of which was in Axis hands.

Naval Stores Report

In addition to its regular Annual and Semi-Annual Naval Stores Reports on production, consumption and stocks of naval stores, the Naval Stores Research Division of the Bureau of Agricultural and Industrial Chemistry has, at the request of some of the War Agencies, begun the issuance of quarterly reports. These reports are issued under Federal Act 278, authorizing and directing the Secretary of Agriculture to collect, compile and publish statistics and essential information relating to spirits of turpentine and rosin produced, held and used in the domestic and foreign commerce of the United States.

If production figures for this period are used as a basis for estimating this season's probable production, the fact that gum naval stores production is seasonal should be borne in mind. Wood naval stores production, on the other hand, is not seasonal but is based largely upon probable consumer demand and to some degree upon labor.

Stocks of wood rosin do not include so-called "B wood rosin." While sulfate wood turpentine is carried in the regular production and carryover tables, data on "sulfate wood rosin" ("liquid rosin" or "tall oil") are in a table separate from gum and wood rosins. Pending the selection of a proper term, we continue to refer to the mixture of resin and fatty acids recovered from the acidulated soap curds obtained in the production of sulfate pulp as "tall oil." The "sulfate wood rosin" or "tall oil" so obtained contains approximately 42 percent of resin acids.

The data on production, consumption and stocks are expressed in commercial units: For turpentine—barrels of 50 gage gallons; and for rosin—barrels of approximately 500 pounds gross weight. A unit of naval stores consists of one barrel of turpentine and three and one-third barrels of rosin. Carryover figures do not include gum turpentine or rosin producible from crude gum on hand.

Summary of Turpentine Supply, Distribution and Carryover (Bbls.—50 gals.)

	1943-44 3 *mos.* (*Oct.-Dec.*)			1942-43 3 *mos.* (*Oct.-Dec.*)		
	Total	*Gum*	*Wood*	*Total*	*Gum*	*Wood*
Table 1a—Supply and Distribution						
U. S. Carryover Oct. 1[1]	315,287	269,918	45,369	244,028	173,615	70,413
Production[2]	129,724	75,131	54,593	136,558	84,347	52,211
Imports	- - Not available - -			- - Not available - -		
Available Supply	445,011	345,049	99,962	380,586	257,962	122,624
Less Carryover Dec. 31[3]	323,034	285,515	37,519	293,100	220,298	72,802
Appar. Total Consumption	121,977	59,534	62,443	87,486	37,864	49,822
Less Exports	- - Not available - -			- - Not available - -		
Appar. U. S. Consumption	- - Not available - -			- - Not available - -		
Table 2a—Carryover (Stocks)						
U. S. Carryover Oct. 1	315,287	269,918	45,369	244,028	173,615	70,413
U. S. Carryover Dec. 31	323,034	285,515	37,519	293,100	220,298	72,802
Increase	7,747	15,597	.....	49,072	46,683	2,389
Decrease	.....	.....	7,850	.....	.....	.....

[1] Table 1a. 1943-44 Semi-Annual Naval Stores Report.
[2] Table 5a.
[3] Table 4a.

Summary of Rosin Supply, Distribution and Carryover (Bbls.—500 lbs. gross)

	1943-44 3 *mos.* (*Oct.-Dec.*)			1942-43 3 *mos.* (*Oct.-Dec.*)		
	Total	*Gum*	*Wood*	*Total*	*Gum*	*Wood*
Table 1b—Supply and Distribution						
U. S. Carryover Oct. 1[1]	1,398,688	1,205,421	193,267	1,586,773	1,298,667	288,106
Production[2]	448,009	254,923	193,086	531,566	300,574	230,992
Imports	- - Not available - -			- - Not available - -		
Available Supply	1,846,697	1,460,344	386,353	2,118,339	1,599,241	519,098
Less Carryover Dec. 31[3]	1,216,789	1,036,549	180,240	1,843,827	1,518,612	325,215
Appar. Total Consumption	629,908	423,795	206,113	274,512	80,629	193,883
Less Exports	- - Not available - -			- - Not available - -		
Appar. U. S. Consumption	- - Not available - -			- - Not available - -		
Table 2b—Carryover (Stocks)						
U. S. Carryover Oct. 1	1,398,688	1,205,421	193,267	1,586,773	1,298,667	288,106
U. S. Carryover Dec. 31	1,216,789	1,036,549	180,240	1,843,827	1,518,612	325,215
Increase	.....	.....	.....	257,054	219,945	37,109
Decrease	181,899	168,872	13,027	.....	.....	.....

[1] Table 1b. 1943-44 Semi-Annual Naval Stores Report.
[2] Table 5b. Includes reclaimed gum rosin.
[3] Table 4b.

Details of Production

	1943-44 3 *mos.* (*Oct.-Dec.*)			1942-43 3 *mos.* (*Oct.-Dec.*)		
	Total	*Gum*	*Wood*	*Total*	*Gum*	*Wood*
Table 3a—Production of Turpentine (Bbls.—50 gals.)						
Gum	75,131	75,131	.....	84,347	84,347	.....
Wood, Steam Dist.	30,204	.....	30,204	29,604	.....	29,604
Wood, Sulphate	23,498	.....	23,498	21,436	.....	21,436
Wood, Dest. Dist.	891	.....	891	1,171	.....	1,171
Total	129,724	75,131	54,593	136,558	84,347	52,211
Table 3b—Production of Rosin (Bbls.—500 lbs. gross)						
Gum	251,601	251,601	.....	295,890	295,890	.....
Reclaimed (gum)	3,322	3,322	.....	4,684	4,684	.....
Wood, Steam Dist.	193,086	.....	193,086	230,992	.....	230,992
Wood Sulphate (Table 5c)	.....	.....	.....	.....	.....	.....
Wood, Dest. Dist.	.....	.....	.....	.....	.....	.....
Total	448,009	254,923	193,086	531,566	300,574	230,992

Table 3c—Production of "Sulphate Wood Rosin (Tall Oil)"

1943-44 *Oct.-Dec.*	1942-43 *Oct.-Dec.*
40,929 tons black liquor soap	17,687 tons black liquor soap produced to be further processed
17,639 tons tall oil	

Table 4—Miscellaneous Naval Stores (Bbls.—50 gals.)

	1943-44 3 *mos.* (*Oct.-Dec.*) *Production*	1943 *Dec.* 31 *Stocks*	1942-43 3 *mos.* (*Oct.-Dec.*) *Production*	1942 *Dec.* 31 *Stocks*
Pine Oil	27,286	9,961	28,012	16,392
Pine Tar	22,150	1,355	22,130	1,566
Dipentene	3,958	4,199	5,833	20,816
Other Monocyclic Hydrocarbons	8,037	6,316	4,977	13,935

Exports and Imports

Until the United States entered the war back in 1941 the U. S. Department of Commerce issued a monthly summary of foreign commerce. Along with many other vital statistics this information on exports and imports was suspended. Recently, however, the department has begun to issue the back numbers of these reports. In order to bring these figures up to date, as far as released, the following summary of 1941 is published.

Exports of Certain Chemicals and Allied Products in 1941

Articles	*Twelve months ending December 1941* Quantity	Dollars
Coal-Tar Products	.....	29,716,659
Crude and refined coal tar gal.	6,728,284	410,865
Benzol gal.	2,495,841	482,513
Coal-tar pitch ton	5,967	110,103
Creosote or dead oil, gal.	957,728	203,622
Toluene (toluol) lb.	23,987,989	1,233,945
Xylene (oxide) lb.	884,160	44,635
Other crude coal-tar products, n.e.s. lb.	2,749,950	209,221
Phenol (carbolic acid) lb.	3,185,728	460,068
Other coal-tar acids lb.	4,937,200	711,885
Other coal-tar intermediates lb.	16,349,938	3,691,855
Rubber compounding agents of coal-tar products lb.	3,762,239	1,527,223
Colors, dyes, stains, and color lakes lb.	26,772,621	18,225,835
Vanillin lb.	79,247	157,480
Other finished coal-tar products lb.	5,425,232	2,247,407
Medicinal and Pharmaceutical Preparations	.....	43,852,217
Castor Oil gal.	128,860	142,847
White mineral oil gal.	2,952,452	1,191,167
Vitamins and vitasterols	.....	5,473,787
Biologies:		
For animal and vet. use	.....	597,921
Serum and antitoxins for human use	.....	1,194,492
Vaccines for human use	.....	468,909
Glandular products, organotherapeutics, enzymes, ferments and culture media	.....	2,805,829
Druggists' nonproprietary preparations:		
Elixirs, tinctures, fluid extracts, ampoules, and similar liquid solutions	.....	3,635,486
Tablets, pills, capsules, powders, ointments, and similar manufactures	.....	8,371,196
Medicinal chemicals (U.S.P.) for prescription use	.....	6,9884,995
Household medicinal chemicals and pharmaceuticals in small packagse:		
Solids	.....	722,597
Liquids	.....	353,208
Proprietary medicinal preparations:		
Mouth washes, gargles, and personal antiseptics	.....	486,325
Corn and foot remedies	.....	78,524
Plasters	.....	656,711
Liniments	.....	128,769
Salves and ointments:		
For burns, cuts, skin diseases, insect bites, inflammation, etc.	.....	526,850
For coughs, colds, catarrh, and bronchial infection	.....	889,223
Cold, cough, and bronchial preparations	.....	836,175
Asthma, catarrh, and hay-fever preparations, including inhalants	.....	255,653
Malaria, chill and fever remedies	.....	176,322
Tonics, blood purifiers emulsion, and appetizers	.....	2,258,819
Laxatives, purgatives, and Cathartics	.....	1,290,617
Milk of magnesia	.....	261,688
Digestive preparations	.....	276,116
Headache, neuralgia, and pain remedies	.....	1,013,892
Other proprietary medicinal preparations	.....	2,774,102
Chemical Specialties	.....	47,215,218
Nicotine sulfate (40% basis) lb.	595,994	388,073
Copper sulfate (blue vitriol)	69,021,176	2,950,714
Lead arsenate lb.	9,594,489	871,985
Calcium arsenate lb.	5,897,598	285,071
Petroleum oil sprays, agricultural gal.	226,712	65,490
Pyrethrum extract lb.	321,739	319,208
Seed disinfectants lb.	245,468	91,440
Other agricultural insecticides, fungicides, and similar preparations and materials, dry or liquid basis lb.	12,082,891	1,377,432
Household and industrial insecticides, exterminators, and repellants, in liquid, paste, powder or solid form lb.	6,325,137	1,214,738
Household and industrial disinfectants, deodorants, germicides, and similar preparations lb.	3,423,428	390,344
Baking powder lb.	2,575,381	414,578
Tobacco saucing or extract used for flavoring tobacco lb.	131,316	54,136
Other tobacco extracts, lb.	211,516	11,893
Dextrine or British gum lb.	11,288,570	589,613
Textile specialty compounds lb.	9,851,258	1,395,828
Tanning specialty compounds lb.	11,065,534	953,238
Water softeners, purifiers, boiler and feed-water compounds lb.	4,732,828	465,349
Metal-working compounds lb.	4,900,620	474,450
Synthetic gums and resins:		
In powder, flake or liquid form:		
Ester gums lb.	2,739,375	289,184
Alkyd resins lb.	1,643,355	282,260
Tar-acid resins lb.	6,905,907	1,260,312
Urea lb.	1,136,126	270,660
Other lb.	5,419,312	2,320,343
Sheets, plates rods, tubes, and other unfinished forms:		
Laminated lb.	620,925	338,918
Not laminated lb.	1,107,650	840,406
Pyroxylin products:		
Pyroxylin scrap and film scrap lb.	445,447	67,816
Pyroxylin plastic film support (film base), lb.	4,757,644	4,216,128
Pyroxylin sheets, rods, or tubes lb.	678,372	569,512
Cellulose acetate sheets, rods, tubes, molding powder and other unfinished forms (plasticized) lb.	2,480,357	1,411,897
Cellulose, acetate plastic film support lb.	1,582,180	2,022,724
Nitro and aceto cellulose:		
Solutions, collodion, etc. lb.	519,220	166,632
Not in solution lb.	3,776,111	805,402
Cements for sealing cans lb.	2,141,228	431,449
Other cementing preparations for repairing, sealing, and adhesive use lb.	3,692,345	449,330
Specialty cleaning and washing compounds, lb.	5,817,427	655,840
Polishes:		
Metal and stove polishes lb.	667,967	119,993
Shoe polishes and shoe cleaners lb.	2,570,048	623,327
Leather dressings and stains lb.	2,258,168	429,726
Floor wax, wood and furniture polishes lb	1,411,761	265,532
Automobile polishes lb.	793,162	159,429
Natural flavoring extracts gal.	67,423	333,973
Synthetic flavoring extracts gal.	110,414	810,018
Pectin lb.	557,163	425,729
Animal charcoal or bone char, deodorizing, decolorizing, and gas-absorbing carbons lb.	6,250,886	561,126
Rubber compounding agents, n.e.s. lb.	2,661,837	933,966
Anti-knock compounds not of petroleum origin gal	1,795,519	8,008,565
Liquid gum inhibitors for treating petroleum distillates	.....	117,200
Licorice extract and mass	.....	203,009
Reagent chemicals for laboratory use	.....	119,263
Other chemical specialty compounds	.....	5,397,969
Industrial Chemicals	.....	63,262,859
Acids and anhydrides:		
Acetic acid lb.	6,124,422	670,445
Acetic anhydride lb.	232,338	35,036
Tartaric acid	1,278,058	697,607
Other organic acids and anhydrides lb.	13,944,031	3,076,699
Inorganic:		
Hydrochloric (muriatic) lb.	8,454,255	271,102
Boric (boracic) lb.	15,279,512	798,443
Other inorganic acids and anhydrides lb.	40,722,926	1,527,475
Alcohols:		
Methanol gal.	409,006	234,347
Ethylene glycol lb.	7,544,812	904,189
Denatured alcohol, solidified lb.	398,126	31,857
Butanol (butyl) alcohol) lb.	5,103,799	469,090
Glycerin lb.	9,585,200	1,316,836
Other alcohols lb.	62,540,498	4,016,856
Acetone lb.	26,805,152	1,920,836
Butyl acetate lb.	4,787,086	496,819
Carbon bisulphide lb.	9,364,785	423,513
Formaldehyde (formalin) lb.	2,139,296	165,613
Amyl acetate lb.	541,607	90,793
Synthetic collecting reagents for concentration of ores, metals, or minerals lb.	14,292,366	2,575,987
Cellulose acetate flake, waste, and scrap (not plasticized) lb.	3,118,852	988,451
Carbon tetrachloride lb.	3,297,337	269,903
Ethyl acetate lb.	1,386,855	225,399
Sodium acetate lb.	649,089	33,448
Ethyl ether lb.	661,305	116,132
Methyl-ethyl ketone lb.	2,467,733	170,023
Other organic chemicals, lb.	14,442,723	4,181,438
Aluminum sulfate lb.	102,521,480	1,184,169
Other aluminum compounds lb.	5,629,037	349,951
Bleaching powder lb.	1,998,161	160,219
Calcium carbide lb.	62,896,588	2,416,257
Calcium chloride lb.	41,554,685	511,366
Bromine, bromides, and bromates lb.	1,474,174	481,565
Iodine, iodides, and iodates lb.	332,711	514,680
Potassium compounds (not fertilizers):		
Bichromate and chromate lb.	4,442,067	543,667
Hydroxide (caustic potash) lb.	7,912,426	600,895
Other lb.	13,410,933	1,827,575
Sodium compounds lb.	654,072,821	17,532,485
Bichromate and chromate lb.	17,182,149	1,494,361
Cyanide lb.	3,728,910	471,952
Borate (borax) lb.	83,585,297	1,893,500
Silicate (water glass), lb.	22,046,344	390,911
Carbonate, calcined (soda ash) lb.	166,870,451	2,310,218
Bicarbonate (baking soda) lb.	38,517,501	710,187
Hydroxide (caustic soda), dry weight lb:	252,478,751	6,085,491
Sodium phosphate, (mono-, di-, tri-, meta-, or pyro-) lb.	9,656,341	545,955
Hydrosulfite and compounds lb.	4,678,968	711,535
Other sodium compounds lb.	55,328,109	2,918,375
Tin compounds lb.	137,424	60,059
Ammonia compounds, n.e.s.	.....	2,351,136
Gases, compressed, liquefied, and solidified:		
Ammonia, anhydrous lb.	12,116,523	970,291
Other gaseous refrigerants lb.	2,998,718	643,084
Chlorine lb.	9,464,819	253,138
Helium gas cu. ft.	10,935	958
Other gases, n.e.s. lb.	3,111,109	660,472
Other Industrial chemicals	.....	6,492,555
Pigments, Paints and Varnishes	.....	27,096,970
Mineral-earth pigments dry):		
Ocher, umber, sienna, and other forms of iron oxide for paints lb.	9,880,975	491,806

Articles	Twelve months ending December 1941 Quantity	Dollars
Other mineral-earth pigments (whiting, barytes, etc.) ....lb.	51,040,805	854,907
Chemical pigments (dry):		
Chromium oxide ....lb.	415,875	94,373
Zinc oxide ....lb.	16,527,313	1,446,157
Lithopone ....lb.	43,054,543	2,079,229
Lampblack ....lb.	1,883,028	172,764
Carbon black or gas black ....lb.	148,165,297	6,686,312
Red lead ....lb.	5,931,337	437,786
Litharge ....lb.	5,784,570	370,934
White lead:		
Dry (basic lead carbonate) ....lb.	4,409,907	295,428
In oil ....lb.	1,392,373	124,202
Titanium dioxide and titanium pigments, lb.	15,041,016	1,609,071
Other chemical pigments, lb.	13,180,094	2,486,606
Bituminous paints, liquid and plastic	.....	410,500
Paste and semi paste paint colors in oil, putty, and paste wood filler, lb.	5,490,297	707,425
Kalsomine or cold-water paints, dry ....lb.	8,481,094	551,105
Nitrocellulose (pyroxylin) lacquers:		
Pigmented ....gol.	449,089	1,091,753
Clear ....gal.	241,806	467,476
Thinners for nitrocellulose lacquers ....gal.	894,621	679,447
Ready-mixed paints, stains, and enamels gal.	2,900,525	5,207,149
Varnishes (oil or spirit, and liquid dryers), gal.	543,888	832,540
Fertilizers and Fertilizer Materials ....ton	1,451,460	10,062,134
Nitrogenous fertilizer material:		
Ammonia sulfate ...ton	84,616	3,713,355
Other nitrogenous chemical materials ....ton	60,050	2,247,241
Nitrogenous organic waste materials ....ton	5,587	134,535
Phosphatic fertilizer materials:		
Phosphate rock including high-grade hard rock, land pebble, soft rock, colloidal and sintered matrix ....ton	1,040,655	5,859,501
Superphosphate ....ton	146,875	2,983,582
Other phosphate materials ....ton	2,293	147,407
Potassic fertilizer materials ....ton	82,098	2,592,697
Nitrogenous phosphatic types ....ton	8,357	500,787
Prepared fertilizer mixtures ....ton	20,029	889,029
Explosives, Fuses, etc. ..	.....	50,010,564
Explosives:		
Smokeless powder ....lb.	76,612,194	31,866,279
Dynamite ....lb.	39,121,504	4,984,293
Other explosives ....lb.	54,570,883	10,241,345
Fuses and blasting caps:		
Safety fuses ....lin. ft.	218,803,748	1,398,695
Blasting caps ....no.	90,745,761	1,525,952
Soap ....lb.	34,807,138	3,563,840
Medicated ....lb.	355,500	138,890
Toilet or fancy ....lb.	10,911,489	1,679,301
Laundry ....lb.	15,034,688	771,359
Powdered or flaked ....lb.	2,509,246	234,229
Shaving creams ....lb.	363,128	216,972
Shaving cakes, powders, and sticks ....lb.	130,671	53,914
Scouring bricks, pastes, powders, soaps and household washing powders ....lb.	4,330,164	322,166
Other soap ....lb.	1,172,252	147,009
Toilet Preparations	.....	8,053,058
Dental creams ....lb.	2,553,947	2,170,262
Other dentrifice ....lb.	289,481	164,697
Toilet powders:		
Talcum powder in packages	.....	498,711
Face and compact powder	.....	736,569
Creams, rouges, and other cosmetics:		
Cold creams ....lb.	343,012	143,176
Vanishing creams ...lb.	212,029	80,926
Other creams, lotions, and balms	.....	367,950
Rouges	.....	243,668
Lip sticks	.....	977,056
Other cosmetics	.....	185,156
Manicuring preparations..	.....	316,955
Depilatories and deodorants	.....	89,139
Hair preparations	.....	751,771
Perfumery and toilet waters	.....	765,082
Other toilet preparations	.....	567,940
Coal-Tar Products	.....	39,383,915
Dead or creosote oil, free gal.	13,469,389	1,561,705
All other crudes, free.....	.....	1,236,193
Acids, dut. ....lb.	16,900	16,386
Other intermediates, dut., lb.	3,843,8864	1,324,015
Colors, dyes, stains, color acids, and color bases, n.e.s., dut. ....lb.	2,157,426	4,087,267
Coal-tar medicinals, dut., lb.	8,847	100,366
Other finished products, dut. ....lb.	6,424,663	1,057,983
Medicinal and Pharmaceutical Preparations..	.....	8,590,658
Quinine sulfate, free, oz.	7,890,958	4,564,340
Other quinine and alkaloids and salts from cinchona bark, free, oz.	1,943,681	1,010,728
Other alkaloids, salts, and derivatives, dut.	.....	62,561
Mustard oil, natural, dut. ....lb.	.....	.....
Antitoxins, serums, vaccines, etc., free, oz...	.....	.....
Menthol, dut. ....lb.	372,973	1,064,692
Santonin and salts, free, lb.	3,458	216,285
Other medicinals, dut.	.....	617,326
Preparations in capsules, pills, tablets, etc., dut.	.....	354,743
Other preparations, n.e.s., dut.	.....	699,983

Imports of Certain Chemicals and Allied Products in 1941

Articles	Twelve months ending December 1941 Quantity	Dollars
Acetylene, butylene, ethylene, and propylene derivatives, dut. ....lb.	1,341,282	320,655
Acids and anhydrides:		
Acetic or pyroligneous, dut. ....lb.	4,962,647	252,092
Arsenious (white arsenic), free ....lb.	20,583,253	598,006
Formic, dut. ....lb.	.....	.....
Oxalic, dut. ....lb.	.....	.....
Sulfuric (oil of vitriol), free ....lb.	6,358,025	39,553
Tartaric, dut. ....lb.	7,164	3,866
All other, free ....lb.	4,280	175
All other, dut. ....lb.	4,468,361	106,387
Alcohols, including fusel oil, dut.	.....	3,534
Ammonium compound, n.e.s.:		
Chloride (muriate), dut. lb.	740,992	25,069
Nitrate, dut. ....lb.	.....	.....
All other, dut. ....lb.	6,099,688	230,702
Barium compounds, dut. lb.	604,105	15,070
Calcium compounds, dut. lb.	6,800	234
Cellulose products, n.e.s.:		
Acetate, dut. ....lb.	4,561	2,330
All other:		
Sheets more than 3/1000-inch thick and other forms, dut. ....lb.	9,595	5,394
Sheets, bands, and strips more than 1 inch wide, not over 3/1000-inch thick, dut. ....lb.	36,339	8,007
Camphor:		
Natural, crude, dut., lb.	133,343	54,862
Natural, refined, dut., lb.	546,031	337,020
Synthetic, dut. ....lb.	5	6
Cobalt oxide, dut. ....lb.	38,002	55,120
Copper sulfate (blue vitriol), dut. ....lb.	.....	.....
Copper sulfate (blue vitriol), copper content, dut. ....lb.	....	.....
Glycerin, crude, dut...lb.	9,020,094	755,759
Glycerin, crude, dut...lb.	9,020,094	755,759
Iodine, crude, free....lb:	1,010,039	1,121,513
Lime chlorinated or bleaching powder, dut. ....lb.	232,355	14,611
Magnesium compounds, dut. ....lb.	2,342,448	130,523
Potassium compounds, n.e.s.:		
Carbonate, dut. ....lb.	9,606	1,235
Chlorate and perchlorate, dut. ....lb.	267,073	46,232
Cream of tartar, dut., lb.	44,423	14,427
Cyanide, free ....lb.	.....	.....
Hydroxide (caustic), dut. lb.	23,323	4,284
Argols, tartar, and wine lees, free ....lb.	25,360,949	4,606,751
All other, dut. ....lb.	121,261	30,042
Sodium compounds, n.e.s.:		
Sulfate, (salt cake), free, ton	67,474	850,589
Sulfate anhydrous and crystallized, dut. ..ton	30	1,234
Chlorate, dut. ....lb.	2,600	148
Cyanide, free ....lb.	72,635,948	2,788,209
Ferrocyanide (yellow prussiate), dut. ....lb.	.....	.....
Nitrite, dut. ....lb.	.....	.....
Phosphates (except pyrophosphate) dut. ..lb.	1,200	54
All other, free ....lb.	110,230	672
All other, dut. ....lb.	1,058,337	50,740
Radium salts, free milligram	4,412	110,202
Other industrial chemicals, free	.....	1,570,006
Other industrial chemicals, dut.	.....	1,122,832
Pigments, Paints, and Varnishes	.....	845,579
Mineral earth pigments:		
Iron oxide and hydroxide, dut. ....lb.	17,033,816	523,086
Ochers and siennas, dut. lb.	760,192	11,717
All other, dut.	.....	35,967
Chemical pigments:		
Lithopone and other zinc sulfides, dut. ....lb.	112	9
Zinc oxide and leaded zinc oxide, dut. ...lb.	266,290	19,756
All other, dut. ....lb.	659,127	99,079
Paints, stains, and enamels, dut.	.....	137,750
Varnishes, dut. ....gal.	6,133	18,215
Fertilizers and Materials, ton	1,096,302	22,766,667
Nitrogenous:		
Ammonium sulfate, free, ton	35,119	1,239,480
Ammonium nitrate mixtures (not containing phosphoric acid or potash), free ....ton	.....	.....
Calcium cyanamid (lime nitrogen) free ....ton	143,878	2,654,024
Calcium nitrate, free, ton	.....	.....
Guano, free ....ton	17,241	460,370
Dried blood, free ....ton	18,779	650,373
Sodium nitrate, free..ton	610,569	10,868,568
Urea and calurea, free, ton..	.....	.....
Other nitrogenous, free ton	142,408	3,858,539
Phosphates:		
Animal carbon and precipitated bone, free,		
Other phosphates, free ton	24,313	340,017
Potash fertilizers:		
Chloride, crude, free, ton	14,671	296,367
Kainite, free ....tton	.....	.....
Manure salts, free ...ton	.....	.....
Sulfate, free ..... ton..	.....	.....
Nitrate (saltpeter) free, ton	34,541	725,846
Other potash-bearing substances, free, ton...	125	1,714
Fertilizer compounds, containing nitrogen, phosphoric acid, and potash, free ....ton	.....	.....
All other, free ....ton	54,658	1,671,369
Explosives	.....	1,378,455
Powder and other explosives, n.e.s., dut. ..	.....	893,722
Firecrackers, dut. ....lb.	2,365,743	476,808
Fireworks and ammunition, dut.	.....	7,925
Soap and Toilet Preparations	.....	2,459,229
Soap:		
Castile, dut. ....lb.	15,326	1,386
Toilet, dut. ....lb.	383,842	163,418
Other, dut. ....lb.	10,676,565	326,583
Perfume materials, free lb.	5,644	570,190
Perfume materials, dut., lb.	.....	1,156,919
Perfumery, bay rum, and toilet water, dut.	.....	164,884
Bath salts, dut. ....lb.	7,379	1,701
Cosmetics, powders, creams, etc., dut.	.....	74,148

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PREVENT DAMAGE FROM MOISTURE OXIDATION & ABRASION

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MARKETS IN REVIEW

Rising costs add to chemical production problems.

War output remains at peak level.

More chemical prices are reduced.

Fantastic dye production increases.

What is needed for resuming civilian production?

Supply shortages in the paint and varnish industry.

Alcohol is still the nation's No. 1 headache.

New trends in fertilizer manufacture.

Heavy Chemicals, Fine Chemicals, Coal Tar Products, and Paint Materials reviewed.

CHEMICAL PRODUCTION and distribution were still faced with a number of unsolved problems during April and May although the industry's output remained at a very high level. The earnings reports of chemical manufacturers covering the first quarter seem to bear this out more than the usual industrial barometers. Many producers of chemicals experienced losses in first quarter earnings from a year ago although the sales volume in a number of instances was greater.

It is not just a co-incidence that the two foremost producers of phosphate materials for the Government suffered a setback in earnings during the first three months. One which had greater sales indicated that this circumstance was more than offset by increased costs and taxes, and it was frankly admitted that phosphate is being sold to the Government at "nominal" prices rather than at levels which would afford a profit to the manufacturer.

The picture of chemical activity as given by the Federal Reserve Board at the close of the quarter is a rather confusing one; still, the data are not that contradictory that they cannot be explained. The index for "Chemicals" production, adjusted, dived all the way from 360 in Feburary to 343 in March, while the Federal Reserve index for "Industrial Chemicals" remains stable around the 399 figure given for February, the peak for the war period. The "Chemicals" index in its revised form is based on the activity in many chemical-consuming lines as well as production, while the "Industrial Chemicals" data more closely represent the industry's productive activities.

Prices for chemicals, contrary to all expectations, are going down in the midst of a great war, and the reductions are by no means confined to high-priced research specialties. The foremost war manufacturers of acrylic resin sheets, Du Pont and Rohm and Haas, sliced 4.5 to 10.8 per cent from the price schedules for this important plastic material. The first named manufacturers almost at the same time reduced tank car prices for formaldehyde, essential methanol derivative which enters hexamethylenetetramine explosives, phenolic and other plastics, thereby passing on to Government and industry economies achieved in production. In April, Du Pont was able to bring down the cost of nylon molding powder 50c per pound following an earlier price reduction in nylon for textile use.

And while price reductions are under discussion, it should be noted here that polystyrene was lowered 3c per pound early in March by Dow, the largest single producer of the styrene monomer. In November, 1942, Dow had lowered polystyrene from 45c to 30c per pound. It is now around 27c lb., and one begins to understand predictions, voiced some time ago, that we are headed for a postwar plastics competition which may profoundly affect many materials in that industry. Not related in any manner to the plastic raw and finished materials are price declines which took place at the beginning of May in a number of mercurial compounds, amounting to 15c and 20c per lb. and affecting red and yellow iodides and mercurial ointments. These reductions follow cuts made some time ago in the major mercurials. Mercury itself again is in an easy position.

Dyestuffs manufacturers have been voicing some apprehension over the possibility that sudden termination of military demands will find them with facilities and materials tied up in war colors, O.D. and khaki particularly, to such an extent that reconversion will be costly as well as time-consuming. Their position will be appreciated when it is realized that the production of one dyestuff alone, Vat Khaki, has been skyrocketed some 500,000 per cent over prewar output, and that the processing of other fast vat colors, mostly anthraquinone vats denied for civilian use, has been increased to almost fantastic figures. One difficulty pointed out by a manufacturer is the absence of protective provisions in current war contracts due to the fact that the supplier of dyes is in the position of sub or sub-sub-contractor to the textile processor who is usually the prime contractor. Cancellations or cutbacks of large Quartermaster requirements hence might find the dyestuff producer with large quantities of colors on hand in finished and intermediate stages.

It must be conceded that thus far no serious losses have been incurred through war contract stoppages or curtailments. Sudden termination of hostilities, however, could find the dye and chemical companies with vat dyes and processes having no civilian outlets. The postwar world is certain to shun khaki and drab colors, go in for brilliantly dyed apparel. And some textile experts expect this demand may be great enough to send production of dyestuffs in the aggregate above prewar totals. During 1938 United States dye output amounted to 81,759,000 lbs.; in 1939, ot 120,191,000 lbs. Some organic chemical manufacturers have erected additional plant capacity to take care of military demands.

This new productive capacity may be devoted to civilian colors if conversion can be carried out at reasonable costs, because there are still some synthetic dye items made abroad, which were being imported prior to the war. and which will have to be duplicated here, patent arrangements with the Government permitting. New synthetic fibers developed during the war, and combinations of these with existing fibers in future textile fabrics, offer other possible outlets to the synthetic organic chemical industry.

The key to resumption of civilian goods production, which should be of major interest to the chemical supply trades and industries, lies in the availability of metals and forest products, in the view of Government economists. Manpower is the other foremost consideration and the resumption of and reconversion to civilian manufacture also hinges upon other broader Government policies now in dispute between the WPB and other Federal agencies. Changeovers of this kind will require more than just metals and forest products, a fact which the economists appear to have overlooked. Alcohol and solvents, acids, resins, rubber, chlorine, alkalies, might be mentioned among materials which will be needed in much greater quantity for civilian goods manufacture than they are being allocated for this purpose at present.

WPB Chairman Donald Nelson's stated policy probably is the only guide

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to the Government's real intentions with regard to civilian production. And that is that it will be maintained at the highest possible level, now and during the conversion period, "compatible with effective prosecution of the war." All decisions in the matter of war or civilian production are to be made in the public interest rather than in the interest of any industry, from which it is not difficult to conclude that resumption of civilian goods production in any line now serving the war will have to wait indefinitely. Availability of materials may not be the deciding factor in industries where manpower and facilities are required for military production.

Paint and varnish manufacturers are learning that the solution of one supply problem does not clear up a major materials difficulty. Shellac is an example. Supplies of orange shellac have undergone steady improvement in recent months, yet floor and furniture shellac varnishes cannot be made owing to insufficient alcohol. Normally, supplies of specially denatured alcohol for this purpose are plentiful. Today, alcohol required by the varnish makers is subject to the Alcohol Order M-30, and no relief will be forthcoming until the Government's No. 1 supply headache, alcohol, is mitigated in some manner not now apparent.

Due to exceedingly heavy requirements by butadiene conversion processes in the Federal rubber program, our alcohol needs for 1944 (on basis of WPB estimate made May 4) will be 636,000,000 gallons, and the supply from all sources, including 25,000,000-gallon imports, 611,000,000 gallons. In the meantime the Government's 150,000,000-gallon stockpile has dwindled to 87,500,000 gallons (as of April 15) and the WPB Chemicals Bureau expects it wil go down to 59,000,000 gallons at the end of 1944.

Aside from this stockpile, the alcohol supply situation has not improved. In the meanwhile both industry and WPB are studying the so-called Seagram Plan as a possible solution to the indicated 25,000,000-gallon deficit. Under this plan private interests would buy cane sugar alcohol in Cuba and exchange the amount purchased for a lesser amount of alcohol made in this country which could be used for beverage purposes. For example, 50,000,000 gallons of exportable cane sugar alcohol would be bought in Cuba and exchanged for 35,000,000 gallons of grain alcohol now held in stock here.

The paint industry, however, is being assured of larger oil supplies. They are being allowed an aggregate amount of paint oils equivalent to 70 per cent of their 1940-1941 average in place of the 60 per cent rule which prevailed for the second quarter. Under another order, certain fish oils such as sardine and menhaden, have to be set aside to the extent of 33 per cent of production for essential uses. Among the latter are ship bottom paint, alkyd resins, heat-resistant paints, insulating varnishes, natural and synthetic resins.

The fertilizer movement this spring has been featured by the introduction of nitrogen compounds formerly imported and by new ammoniating solution formulas. Cal-Nitro of American manufacture has been made available for the first time in this section after having had some distribution in Virginia and the Carolinas. There is reason to believe its production at Hopewell, Va., has been increased. The domestic Cal-Nitro contains 20.5 per cent nitrogen, 9 per cent calcium oxide, and 7 per cent magnesium oxide. The large synthetic ammonia interest at Belle, W. Va., also has offered, for the first time, sulfate of ammonia in small quantities which it obtains as a by-product in certain operations. The latter also issued a new price list of fertilizer ammonia compounds, effective June 1, wherein the free ammonia content in some of these compounds is based on the recently reduced tank car cost of $59 per ton for anhydrous ammonia.

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CALCIUM BENZYL PHTHALATE, pure
BENZYL DISULFIDE
CALCIUM IODOBEHENATE, U. S. P.
CALCIUM LEVULINATE, pure
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CAMPHORIC ACID, C. P.
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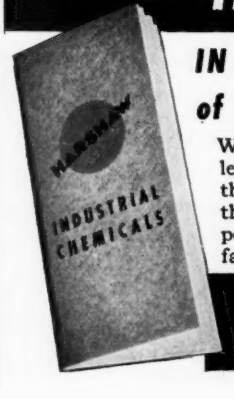

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THE HARSHAW CHEMICAL CO.
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BRANCHES IN PRINCIPAL CITIES

Heavy Chemicals. Considerable strength is shown by most of the large-tonnage products; especially the alkalies, oxalic, sulfuric and chromic acids, bichromates, potassium chemicals and various metallic derivatives. Rayon producers, now engaged in a large high-tenacity cord program, are needing increased supplies of sodium hydroxide over the summer and fall months. A good part of textile consumption has been in the form of liquid caustic. With the pressure of aluminum requirements tending to relax, soda ash is in a somewhat better supply position although this may be offset to an extent by expanded needs of the leading maker for synthetic nitrate of soda. A firmer market position appears to have developed for copper sulfate. Insecticide demands for it here have been met, but the creation of any surplus has been prevented by greater releases of sulfate for export. Products in the water purification and treatment group—chlorine, alumina sulfate and ammonia—are being taken in increasing amounts for this purpose with the approach of the summer season. Anhydrous ammonia is also required increasingly for refrigeration. Oxalic acid needs for the war program have undergone expansion and producers report outputs sold ahead. Bichromates are still difficult to locate in ample quantity. It is reported that bichromate of soda is now 10¼c lb. for export, f.a.s., and the potash, 14¾c.

Fine Chemicals. Price maximums established by OPA on menthol is creating difficulty for those engaged in its importation from Brazil. The latter market at one time was firmly established at $33 per kilo, or $2.70 per kilo above the OPA ceiling. Some business has been placed within the maximums, but it is reported that many others have been unable to negotiate shipments. A recurrence of the corn supply difficulty which forced processors to curtail operations emphasized firm conditions surrounding the market for butyl alcohol and butyl acetate. Supplies of these solvents as well as of ethyl acetate were scarce. Additional strength developed for tartrates, and the movement in citric acid expanded seasonally. Glycerin is now considered in a better supply position than it was last year at this time and production is probably sufficient to meet all essential uses. The Bureau of Agricultural Economics showed that glycerin consumption by the drug and pharmaceutical industries last year amounted to 10,750,000 lbs. Quicksilver, ruling at $125. to $128. per flask, is considered in an easy position and some market factors expect it will drop below $100 before the year is over.

Coal Tar Products. Intermediates continue to enter war production processes at a heavy rate led by phthalic anhydride, benzol and phenol derivatives. The more basic coal tar items show little relaxation from the strong position they have been in since this country entered the war, although the supply position in phenol probably is less critical as the result of constantly expanded plant capacity. The production of phenolic resins is governed more by the supply of plasticizers, particularly dibutyl phthalate and other phthalate chemicals. Benzol is increasingly demanded for major war programs such as synthetic rubber and aviation gasoline. Manufacturers of certain benzol derivatives—benzoic acid is cited as an example—are not able to take on new business. Requirements in salicylic acid technical are reported running in excess of current production.

Paint Materials. In view of the mounting demands from rubber manufacturers only a comparatively small percentage of carbon black production is going to the paint and lacquer industries. Some makers of carbon black have been able to expand production 50 per cent over this time last year, and output for 1944 is estimated by one factor at 180,000,000 lbs., and for 1945 at 220,000,000 lbs. Titanium dioxide continues firm despite the recent release of 10 per cent of production held as a reserve.

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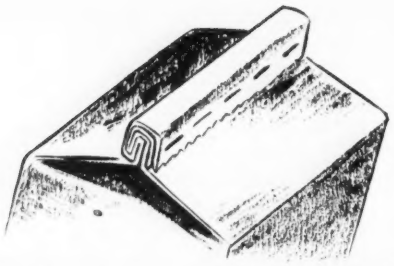

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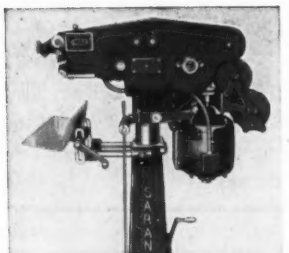

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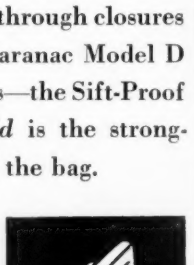

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CURRENT PRICES

Chemical prices quoted are of American manufacturers for spot New York, immediate shipment, unless otherwise specified. Products sold f.o.b. works are specified as such. Import chemicals are so designated.

Oils are quoted spot New York, ex-dock. Quotations f.o.b. mills, or for spot goods at the Pacific Coast are so designated.

Raw materials are quoted New York, f.o.b., or ex-dock. Materials sold f.o.b. works or delivered are so designated.

The current range is not "bid and asked," but are prices from different sellers, based on varying grades or quantities or both.

Purchasing Power of the Dollar: 1926 Average—$1.00
April, '42, $0.964 April, '43, $0.893 April, '44, $0.890

	Current Market	1944 Low	1944 High	1943 Low	1943 High
Acetaldehyde, 99%, drs. wks. lb.	.11	.11	.14	.11	.14
Acetic Anhydride, drs, ...lb.	.11½	.11½	.13	.11½	.13
Acetone, tks, delv (*PC*) ..lb.	...	...	.07	...	.07
ACIDS					
Acetic, 28%, bbls (*PC*) 100 lbs.	3.38	3.38	3.63	3.38	3.63
glacial, bbls. .....100 lbs.	9.15	9.15	9.40	9.15	9.40
tks, wks .....100 lbs.	...	...	6.93	...	6.93
Acetylsalicylic, Standard USP .....lb.	.40	.40	.54	.40	.54
Benzoic, tech, bbls lb.	.43	.39	.47	.39	.47
USP, bbls, 4,000 lbs. up lb.	...	...	.54	...	.54
Boric, tech, bbls, c-l, ton *a*	...	109.00	...	109.00	... 109.00
Chlorosulfonic, drs, wks . lb.	.03	.04½	.03	.04½	.03 .04½
Citric, crys, gran, bbls, lb. *b*	.20	.24	.20	.24	.20 .24
Cresylic 50%, 210-215° HB, drs, wks, frt equal gal.	.81	.83	.81	.83	.81 .83
Formic, Dom. cbys .....lb.	.10½	.11½	.10½	.11½	.10½ .11½
Hydrofluoric, 30% rubber, dms. .....lb.	.08	.09	.08	.09	.08 .09
Lactic, 22%, lgt. bbls wks lb.	.039	.0415	.039	.0415	.039 .0415
44%, light, bbls wks lb	.073	.0755	.073	.0755	.073 .0755
Maleic, Anhydride, drs lb	25	.26	.25	.26	.25 .26
Muriatic, 18° cbys ...100 lb.	1.50	2.45	1.50	2.45	1.50 2.45
20° cbys, c-l, wks ..100 lb.	...	1.75	....	1.75	... 1.75
22° cbys, c-l, wks 100 lb.	...	2.25	...	2.25	... 2.25
Nitric, 36°, cbys, wks 100 lbs. *c*	5.00	5.25	5.00	5.25	5.00 5.25
38°, c-l, cbys, wks 100 lbs. *c*	...	5.50	...	5.50	... 5.50
40°, c-l, cbys, wks 100 lbs. *c*	...	6.00	...	6.00	... 6.00
42°, c-l, cbys, wks 100 lbs. *c*	...	6.50	...	6.50	... 6.50
Oxalic, bbls, wks (*PC*) lb.	.11¼	.12½	.11¼	.12½	.11¼ .12½
Phosphoric, 100 lb. cbys, USP .....lb.	.10½	.13	.10½	.13	.10½ .13
Salicylic, tech, bbls (*PC*) lb.	.26	.42	.26	.42	.26 .44
Sulfuric, 60°, tks, wks ton	...	13.00	...	13.00	... 13.00
66°, tks, wks ton	...	16.50	...	16.50	... 16.50
Fuming (Oleum) 20% tks. wks .....ton	...	19.50	...	19.50	... 19.50
Tartaric, USP, bbls .....lb.	...	.70½	...	.70½	... .70½
Alcohol, Amyl (from Pentane) tks, delv .....lb.	...	.131	...	.131	... .141
Butyl, normal, syn, tks (PC) .....lb.	...	.10¾	...	.10¾	.10¾ .14¼
Denatured, CD, 14, c-l drs, (*PC, FP*) ....gal. *d*	...	.54½	...	.54½	... .54½
Denatured, SD, No. 1, tks. *d*	...	.50	...	.50	... .50
Ethyl, 190 proof tks....gal	...	17.60	...	17.60	... 11.90
Isobutyl, ref'd, drs .....lb.	...	.086	...	.086	... .086
Isopropyl ref'd, 91%, dms .....gal.	.39	.66½	.39	.66½	.39 .66½
Propyl, nor, drs, wks gal	.67	.70	.67	.70	.67 .70
Alum, ammonia, lump, bbls, wks .....100 lb.	...	4.25	...	4.25	... 4.25
Aluminum, 98-99%, (*FP*) .....100 lb.	15.00	16.00	15.00	16.00	15.00 16.00
Chloride anhyd dms wks lb.	.08	.12	.08	.12	.08 .12
Hydrate, light, (A) ....lb.	.14½	.15	.14½	.15	.14½ .15
Sulfate, com, bgs, wks, c-l .....100 lb.	1.15	1.25	1.15	1.25	1.15 1.25
Sulfate, iron-free, bgs, wks .....100 lb.	2.35	2.50	2.35	2.50	1.75 2.50
Ammonia anhyd, cyl .....lb.	...	.16	...	.16	... .16
Ammonium Carbonate, lumps, dms .....lb.	.08½	.09¼	.08½	.09¼	.08¼ .09¼
Chloride, whi, bbls, wks, 100 lb.	4.45	5.15	4.45	5.15	4.45 5.15
Nitrate, tech. bags. wks. lb.	.0435	.0850	.0435	.0850	.0435 .0850
Oxalate pure, grn, bbls. .lb.	.27	.33	.27	.33	.27 .33
Perchlorate, kgs (A) ...lb.	.55	.65	.55	.65	.55 .65
Phosphate, dibasic tech, bbls .....lb.	.07¼	.08½	.07¼	.08½	.07¼ .08½
Stearate, anhyd, dms ...lb.	...	.34	...	.34	... .34
Sulfate, dms, bulk (A) ton	28.20	29.20	28.20	29.20	28.20 30.00
Amyl Acetate (from pentane) c-l, drs, delv .....lb.	...	.15½	...	.18½	... .18½
Aniline Oil, drs .....lb.	.11½	.12½	.11½	.12½	.11½ .12½
Anthraquinone, sub, bbls. lb.	...	.70	...	.70	... .70
Antimony Oxide, bgs ... lb.	.15	.15½	.15	.15½	.15 .15½
Arsenic, whi, kgs (A)....lb.	.04	.04¾	.04	.04¾	.04 .04¾

USP $25 higher; Prices are f.o.b. N. Y., Chicago, St. Louis, deliveries ½c higher than NYC prices; *y* Price given is per gal; *c* Yellow grades 25c per 100 lbs. less in each case; *d* Prices given are Eastern schedule. *a* Powdered boric acid $5 a ton higher; *b* Powdered citric is ½c higher;

Current Prices

Barium Gums

	Current Market	1944 Low	1944 High	1943 Low	1943 High
Barium Carbonate precip, wks ton	55.00	65.00	55.00	65.00	55.00	65.00
Chloride, tech, cyst, bgs, zone 1 ton	77.00	90.00	77.00	90.00	77.00	90.00
Barytes, floated, bbls. ton	...	36.00	...	36.00	...	36.00
Bauxite, bulk mines (A) ton	7.00	10.00	7.00	10.00	7.00	10.00
Benzaldehyde, tech, cbys, dms lb.	.45	.55	.45	.55	.45	.55
Benzene (Benzol), 90%, Ind. 8000 gal tks, ft all'd gal.	(A)	.15	(A)	.15	(A)	.15
Benzyl Chloride, cbys lb.	.26	.28	.22	.28	.22	.25
Beta-Naphthol, tech, bbls, wks ton	.23	.24	.23	.24	.23	.24
Bismuth metal, ton lots lb.	...	1.25	...	1.25	...	1.25
Blanc Fixe, 66 2/3% Pulp, bbls, wks ton	A 40.00	46.50	40.00	46.50	40.00	46.50
Bleaching Powder, wks, 100 lb.	2.50	8.60	2.50	8.60	2.50	8.60
Borax, tech, c-l, bgs ton	i ...	45.00	...	45.00	...	45.00
Bordeaux Mixture, drs lb.	.11	.11½	.11	.11½	.11	.11½
Bromine, cases lb.	.25	.30	.25	.30	.25	.30
Butyl, acetate, norm drs, lb.	.1895	.1945	.1755	.1945	.1575	.1840
Cadmium Metal (*PC*) lb.	.90	.95	.90	.95	.90	.95
Calcium, Acetate, bgs. 100 lb.	3.00	4.00	3.00	4.00	3.00	4.00
Carbide, drs ton	50.00	95.00	50.00	95.00	50.00	95.00
Carbonate, tech, c-l bgs, ton	18.00	22.00	18.00	22.00	18.00	22.00
Chloride, flake, bgs c-l ton	18.50	35.00	18.50	35.00	18.50	35.00
Solid, 73-75% drs, c-l, ton	18.00	31.50	18.00	31.50	18.00	31.50
Gluconate, U.S.P., drs. lb.	.57	.58	.57	.58	.57	.58
Phosphate, tri, bbls, cl lb.	...	.0635	.0635	.0785	.0635	.0785
Camphor, U.S.P., gran, powd, bbls lb.	.69	.71	.68½	.71	.68½	.70½
Carbon Bisulfide, 55-gal drs lb.	.05	.05¼	.05	.05¼	.05	.05¼
Dioxide, cyl lb.	.06	.08	.06	.08	.06	.08
Tetrachloride, (*FP*) (*PC*) Zone 1, 52½ gal, drms lb.	.73	.80	.73	.80	.73	.80
Casein, Acid Precip, bgs, 100 or more lb.	...	.24	...	.24	...	.24
Chlorine, cyls, lcl, wks, contract (*FP*) (A) lb.	...	.07¼	...	.07¼	...	.07¼
cyls, c-l, contract lb.	j ...	.05¼	...	.05¼	...	.05¼
Liq, tk, wks, contract 100 llb.	...	1.75	...	1.75	...	1.75
Chloroform, tech, drs lb.	.20	.23	.20	.23	.20	.23
Coal tar, bbls, crude bbl.	8.25	8.75	8.25	8.75	8.25	8.75
Cobalt Acetate, bbls (A) lb.	...	.83¾	...	.83¾	...	83¾
Oxide, black kgs (A) lb.	...	1.84	...	1.84	...	1.84
Copper, metal *FP, PC* 100 lb.	12.00	12.50	12.00	12.50	12.00	12.50
Carbonate, 52-54%, bbls lb.	.19½	.20	.19½	.20	.19½	.20½
Sulfate, bbls, wks (A) 100 lb.	5.00	5.50	5.00	5.50	5.00	5.50
Copperas, bulk, c-l, wks ton	...	14.00	...	14.00	...	14.00
Cresol, USP, drs, (A) lb.	.10¾	.11¾	.10¾	.11¾	.10¾	.11¾
Cyanamid, bgs ton	1.52½	1.62½	1.52½	1.62½	1.52½	1.62½
Dibutylamine, c-l, drs. wks lb.	...	.61	...	.61	...	.61
Dibutylphthalate, drs lb.	.1780	.2450	.1780	.2500	.2060	.2300
Diethylaniline, lb drs lb.	...	.40	...	.40	...	.40
Diethyleneglycol, drs lcl. wks. lb.	.14	.15½	.14	.15½	.14	.15½
Dimethylaniline, dms., cl., lcl. lb.	.23	.24	.23	.24	.23	.24
Dimethyl phthalate, drs lb.	.1875	.1925	.1875	.1925	.1875	.2050
Dinitrobenzene, bbls lb.	...	.18	...	.18	...	.18
Dinitrochlorobenzene, dms lb.	...	.14	...	.14	...	.14
Dinitrophenol, bbls lb.	...	.22	...	.22	...	.22
Dinitrotoluene, dms lb.	...	.18	...	.18	...	.18
Diphenyl, bbls lcl. wks lb.	.16	.20	.16	.20	.15	.20
Diphenylamine bbls lb.	...	.25	...	.25	...	.25
Diphenylguanidine, drs lb.	...	.35	...	.35	.35	.37
Ethyl Acetate, 85% Ester tks, frt all'd lb.	.1070	.1175	.1070	.1175	.107	.110
Chloride, drs lb.	.18	.20	.18	.20	.18	.20
Ethylene Dichloride, lcl. wks. E. Rockies, dms lb.	...	.0891	...	.0891	...	.0842
Glycol, dms, cl. lb.	...	.10	...	.10	...	.10
Fluorspar, No. 1, grd. 95-98% bulk, cl-mines ton	...	37.00	...	37.00	...	37.00
Formaldehyde, c-l, bbls, wks (*FP, PC*) lb.	.0550	.0575	.0550	.0575	.0550	.0575
Furfural tech, dms, c-l, wks lb.	...	.12½	...	.12½	...	.12½
Fusel Oil, refd, dms, dlvd lb.	.18½	.19½	.18½	.19½	.18½	.19½
Glauber's Salt, bgs, wks 100 lb.	1.05	1.25	1.05	1.25	1.05	1.25
Glycerin (*PC*) CP, dms, c-l, lb.	...	.18¾	...	.18¾	...	.18¾
Saponification, dms, c-l, lcl or tks lb.	...	.12¾	...	.12¾	...	.12¾

GUMS

Gum Arabic, amber sorts bgs lb.	.13	.13½	.12½	.14	.13½	.17½
Benzoin Sumatra, CS lb.	.52	1.00	.52	1.00	.52	1.00
Copal, Congo, lb.	...	.55¾	...	.55¾	...	.55¾
Copal, East India, chips lb.	...	.12	...	.12	...	.12
Macassar dust lb.	...	.07⅜	...	.07⅜	.07⅜	.11¾
Copal Manila,	13½	.15½	.13½	.15½	.13½	.15½
Copal Pontianak, bold c-l lb.	...	.23⅜	...	.23⅜	...	.23⅜
Ester lb.	.09½	.12	.09½	.12	.09½	.12
Karaya, bbls, bxs, dms, lb.	.18	.40	.18	.40	.14	.40

ABBREVIATIONS—Anhydrous, anhyd; bags, bgs; barrels, bbls; carboys, cbys; carlots, c-l; less-than-carlots, lcl; drums, drs; kegs, kgs; powdered, powd; refined, ref'd; tanks, tks; works, f.o.b., wks.

A Lowest price is for pulp; highest for high grade precipitated; i Crystals $6 per ton higher; USP, $15 higher in each case;

INDUSTRIAL CHEMICALS

COAL TAR PRODUCTS

Benzol	Creosote
Toluol	Pitch Coke
Xylol	Naphthalene
Phenol	Salt Coke
Cresol	Sulfate of Ammonia
Pyridines	Sulphuric Acid
Picolines	Sal Ammoniac

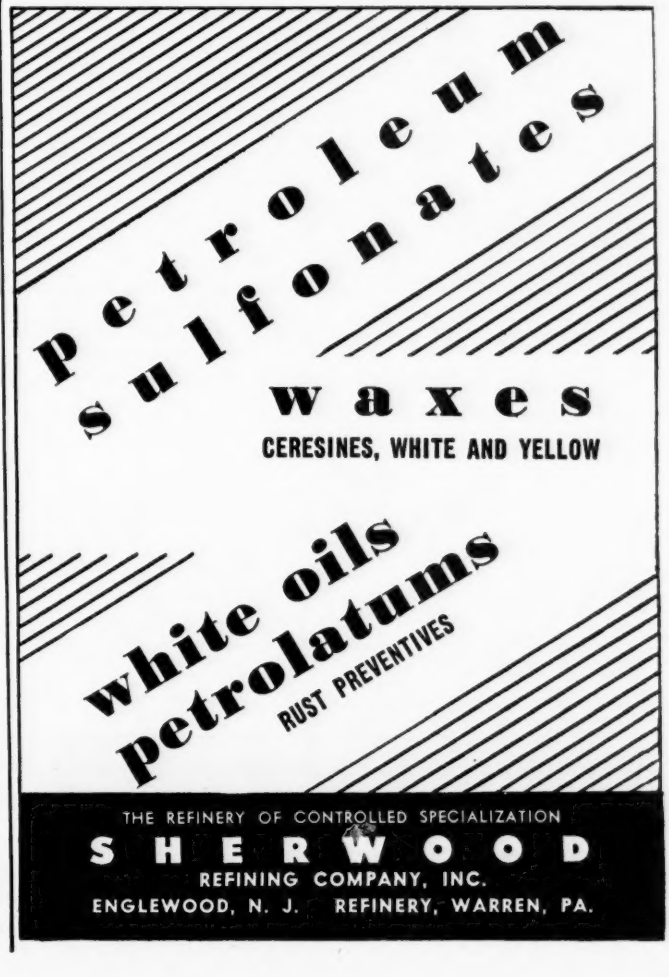
1900 Grant Building

CHEMICAL SALES CORPORATION OF PITTSBURGH

Phone GRant 3750

CHEMICAL SALES CORPORATION

PITTSBURGH 19, PENNSYLVANIA



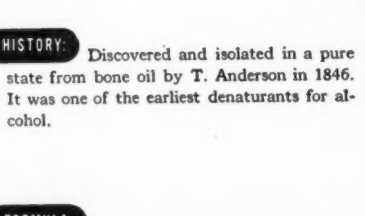
PYRIDINE

DEFINITION: One of the liquid nitrogen bases formed during the destructive distillation of coal. Many related nitrogen compounds—so called "pyridine bases"—are recovered during the purification of pyridine.

HISTORY: Discovered and isolated in a pure state from bone oil by T. Anderson in 1846. It was one of the earliest denaturants for alcohol.

FORMULA:

C_5H_5N



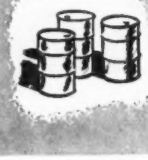
SOURCES: Pyridine is sometimes found in tobacco smoke, and has been isolated from bone oil, shale oil, lignite oils and certain petroleum oils. The chief commercial source is coal tar.

CHARACTERISTICS: Pyridine is a colorless liquid with a penetrating odor. It boils at 115° C and freezes at —42° C (—43.6° F) and is highly refractive to light. It weighs 8.20 pounds to the gallon. It will dissolve in water, alcohol, ether and combines with acids. It has antiseptic properties.

USES: Used in the manufacture of dyes and accelerators for rubber vulcanization, in waterproofing agents for fabrics and in the production of Niacin and sulfa drugs. Related bases are also used for synthesis of Niacin, a chemical of wide application as a vitamin in food enrichment.

GRADES: Classified on the basis of maximum distillation range in Degree Centigrade (of each type), as 2°, 10°, 15°, 20°, 30°, 50° to meet varying requirements. In addition, semi-refined or commercial grades are supplied. All grades are shipped in steel drums.

NOTE: Deliveries today are restricted by the primary requirements of pyridine for war uses.



This is one of a series of advertisements presenting information on basic coal-tar chemicals.

Awarded to the men and women of the Barrett Frankford Chemicals plant for excellence in the production of war materials.

THE BARRETT DIVISION
ALLIED CHEMICAL & DYE CORPORATION
40 Rector Street, New York 6, N. Y.
The Barrett Company, Ltd., 5551 St. Hubert Street, Montreal, Que.
ONE OF AMERICA'S GREAT BASIC BUSINESSES

Current Prices

Gums
Salt Cake

	Current Market	1944 Low	1944 High	1943 Low	1943 High
Kauri, N Y (A)					
Pale XXX ..... lb.	...	.65¼	...	.65¼	...	.65¼
No. 3 ..... lb.	...	.22	...	.22	...	.30
Sandarac, cs ..... lb.	1.40	nom.	1.40	nom.	1.40	nom.
Tragacanth, No. 1, cases lb.	4.00	4.25	4.00	5.25	4.00	5.25
No. 3 ..... lb.	2.75	3.00	1.10	3.50	1.10	1.20
Yacca, bgs (*PC*) ..... lb.	.06	.07¼	.06	.07¼	.06	.07¼
Hydrogen Peroxide, cbys .. lb.	.15½	.18½	.15½	.18½	.15½	.18½
Iodine, Resublimed, jars .lb.	2.00	2.10	2.00	2.10	2.00	2.10
Lead Acetate, crvst, bbls .. lb.	...	.12½	...	.12½	...	.12½
Arsenate, St. bg, lcl .... lb.	.11½	.12	.11½	.12	.11½	.12
Nitrate, bbls ..... lb.	...	.12½	...	.12½	...	.12½
Red, dry, 95% Pb_3O_4, lcl lb.	.09	.10¾	.09	.11	.09	.11
97% Pb_3O_4, bbls delv .lb.	.09¼	.11	.09¼	.11	.09¼	.11
98% Pb_3O_4, bbls delv .lb.	.09½	.11¼	.09½	.11¼	.09½	.11¼
White, bbls ..... lb.	.08¼	.08¾	.08¼	.08¾	.08¼	.08¾
Basis sulfate, bbls, lcl lb.	.07¼	.08	.07¼	.08	.07¼	.08
Lime, Chem., wks, bulk .. ton	6.25	13.00	6.25	13.00	6.25	13.00
Hydrated, f.o.b. wks .. ton	8.50	14.50	8.50	16.00	8.50	16.00
Litharge, coml, delv, bbls lb.	.08	.09¾	.08	.09¾	.08	.09¾
Lithopone, ordi., (*PC*), bgs lb.	.04¼	.04¾	.04¼	.04¾	.04¼	.04¾
Magnesium Carb, tech, wks lb.	.06¼	.09¾	.06¼	.09¾	.06¼	.09¼
Chloride flake, bbls, wks c-l ..... ton	...	32.00	...	32.00	...	32.00
Manganese, Chloride, Anhyd. bbls ..... lb.	.15	.18	.15	.18	.14	nom.
Dioxide, Caucasian bgs, lcl ..... ton	...	74.75	...	74.75	...	74.75
Methanol, pure, nat, drs gal *l*	.63	.76	.63	.76	.63	.76
Synth, drs cl ..... gal. *m*	34½	.40½	.34½	.40½	.34½	.40½
Methyl Acetate, tech tks.. lb.	.06	.07	.06	.07	.06	.07
C.P. 97-99%, tks, delv lb	.09½	.10½	.09½	.10½	.09½	.10½
Chloride, cyl ..... lb.	.32	.40	.32	.40	.31	.40
Ethyl Ketone, tks, frt all'd lb.	...	.08	...	.08	...	.08
Naphtha, Solvent, tks .... gal.	...	.27	...	.27	...	.27
Naphthalene, crude, 74°, wks tks ..... lb.	...	.0275	...	.0275	...	.0275
Nickel Salt, bbls, NY..... lb.	.13	.13½	.13	.13½	.13	.13½
Nitre Cake, blk ..... ton	...	16.00	...	16.00	...	16.00
Nitrobenzene, drs, wks ... lb.	.08	.09	.08	.09	.08	.09
Orthoanisidine, bbls ..... lb.	...	.70	...	.70	...	.70
Orthochlorophenol, drs ... lb.	...	.32	...	.32	...	.32
Orthodichlorobenzene, drms lb.	.07	.08	.07	.08	.07	.08
Orthonitrochlorobenzene, wks ..... lb	.15	.18	.15	.18	.15	.18
Orthonitrotoluene, wks, dms lb	...	.09	...	.09	...	.09
Para aldehyde, 98%, wks lcl, ... lb.	...	.12	...	.12	...	.12
Chlorophenol, drs ..... lb.	...	.32	...	.32	...	.32
Dichlorobenzene, wks .. lb.	.11	.15	.11	.15	.11	.15
Formaldehyde, drs, wks (*FP*) ..... lb.	.23	.24	.23	.24	.23	.24
Nitroaniline, wks, kgs .. lb.	.43	.45	.43	.45	.43	.45
Nitrochlorobenzene, wks .. lb.	...	.15	...	.15	...	.15
Pentaerythritol, tech, bl lb.	.29	.33	.29	.33	.29	.35½
Toluenesulfonamide, bbls lb.	...	.70	...	.70	...	.70
Toluidine, bbls, wks .... lb.	...	.48	...	.48	...	.48

PETROLEUM SOLVENTS AND DILUENTS

Lacquer diluents, tks, East Coast ..... gal.	...	.11½	...	.11½	...	.11
Naphtha, V.M.P., East tks, wks ..... gal.	...	.11	...	.11	...	.11
Petroleum thinner, 43-47, East, tks, wks ..... gal.	.08¾	.09½	.08¾	.09½	.08¾	.09½
Rubber Solvents, stand grd, East, tks, wks .. gal.	...	.11	...	.11	...	.11
Stoddard Solvents, East, tks, wks ..... gal.	...	.09½	...	.09½	...	.09½
Phenol, U.S.P., drs (A) .. lb.	.10½	.11¼	.10½	.11¼	.10½	.13¼
Phthalic Anhydride, cl and lcl, wks (A) ..... lb.	.13	.14	.13	.14	.13	.15½
Potash, Caustic, wks, sol lb.	.06¼	.06¾	.06¼	.06¾	.06¼	.06¾
flake, 88-92% ..... lb.	.07	.07½	.07	.07½	.07	.07½
liquid, tks ..... lb.	...	.02¾	...	.02¾	...	.0275
dms, wks ..... lb.	.03	.03½	.03	.03½	.03	.03½
Potassium Bichromate csks *(*FP*) ..... lb.	.09¾	.10	.09¾	.10	.09¾	.10
Bisulfate, 100 lb kgs ... lb.	.15½	.18	.15½	.18	.15½	.18
Carbonate, hydrated 83-85% calc ..... lb.	.05½	.05¾	.05½	.05¾	.05½	.05¾
Chlorate crys, bgs, wks (A) lb.	.11	.13	.11	.13	.11	.13
Chloride, crys, tech, bgs, kgs ..... lb.	.08	nom.	.08	nom.	.08	nom.
Cyanide, drs, wks ..... lb.	...	.55	...	.55	...	.55
Iodide, bots., or cans .. lb.	1.44	1.48	1.44	1.48	1.44	1.48
Muriate, bgs, dom, blk unit Per Unit K_2O ..... ton	...	.53½	...	.53½	.53½	.56
Permanganate, USP, wks (*FP*) dms ..... lb.	.20½	.21	.20½	.21	.20½	.21
Sulfate, 90% basis, bgs ton	...	36.25	...	36.25	...	36.25
Propane, group 3, tks (*PC*) gal.	...	.03¾	...	.03¾	...	.03¾
Pyridine, ref., drms ..... lb.	.45½	.46	.45½	.46	.45½	.46
R Salt, 250 lb bbls, wks lb.	...	.65	...	.65	...	.65
Resorcinol, tech., drms, wks lb.	.68	.75	.68	.75	.68	.75
Rochelle Salt, cryst ..... lb.	.43½	.47	.43½	.47	.43½	.47
Salt Cake, dom. blk wks .ton	...	15.00	...	15:00	...	15.00

l Producers of natural methanol divided into two groups and prices vary for these two divisions; *m* Country is divided in 4 zones, prices varying by zone.

* Spot price is ½c higher.

	Current Market		1944 Low	1944 High	1943 Low	1943 High
Saltpetre, grn, bbls ...100 lb.	8.20	8.60	8.20	8.60	8.20	8.60
Shellac, Bone dry, bbls lb. *r*	.42½	.46	.42½	.46	.42½	.46
Silver Nitrate, 100 oz, bots oz.	...	.32⅜	...	.32⅜	...	.32⅜
Soda Ash, 58% dense, bgs, c-l, wks ...100 lb.	...	1.15	...	1.15	...	1.15
58% light, bgs cl ...100 lb.	1.05	1.13	1.05	1.13	....	1.13
Caustic, 76% flake drms, cl ...100 lb.	...	2.70	...	2.70	...	2.70
76% solid, drms, cl 100 lb.	...	2.30	...	2.30	...	2.30
Liquid, 47-49%, sellers, tks ...100 lb.	...	1.95	...	1.95	...	1.95
Sodium Acetate, 60% tech, powd, flake, bbls, wks lb.	.05	.06	.05	.06	.05	.06
Benzoate, USP dms ...lb.	.46	.52	.46	.52	.46	.52
Bicarb, bbl, wks ...100 lb.	1.70	2.05	1.70	2.05	1.70	2.05
Bichromate, cks, wks (*FP*) lb.	...	.07¾	...	.07¾	...	.07¾
Bisulfite powd, bbls, wks ...100 lb.	3.00	3.60	3.00	3.60	3.00	3.60
35-40% bbls, wks ..100 lb.	1.40	1.65	1.40	1.65	1.40	1.65
Chlorate, bgs, wks c.l. lb.	...	.06¼	...	.06¼	...	.06¼
Cyanide, 96-98%, wks ..lb.	.14½	.15	.14½	.15	.14½	.15
Fluoride, 95%, bbls, wks lb.	.07¼	.08¼	.07¼	.08¼	.07¼	.08¼
Hyposulfite, cryst, bgs, cl, wks ...100 lb.	...	2.25	...	2.25	...	2.25
Metasilicate, gran, bbl, wks c-l ...lb.	...	2.50	...	2.50	...	2.50
Nitrate, imp, bgs (A) ton	...	33.00	...	33.00	...	33.00
Nitrite, 96-98% dom, cl. lb.	...	.06¾	...	.06¾	...	.06¾
Phosphate, di- wks ..100 lb.	6.00	7.25	6.00	7.25	6.00	7.25
cryst, bgs, c-l ....100 lb.	2.55	2.70	2.55	2.70	2.55	2.70
Tri-bgs, cryst, wks 100 lb.	2.70	3.40	2.70	3.40	2.70	3.45
Prussiate, yel, bbls, wks lb.	.10	.10¼	.10	.10¼	.10	.11
Pyrophosphate, bgs wks c-l lb.	.0528	.0610	.0528	.0610	.0528	.0610
Silicate, 52°, drs. wks 100 lb.	1.40	1.80	1.40	1.80	1.40	1.80
40°, drs, wks, c-l 100 lb.	...	.80	...	.80	...	.80
Silicofluoride, bbls NY..lb.	.06½	.12	.06½	.12	.05	.12
Sulfate, Anhyd, bgs 100 lb.	1.70	1.90	1.70	1.90	1.70	1.90
Sulfide, cryst c-l, bbls, wks ... 100 lb.	...	2.40	...	2.40	...	2.40
Solid, bbls, wks ....lb.	3.15	3.90	3.15	3.90	3.15	3.90
Sulfite, powd, bbls, wks lb.	.05¼	.06	.05¼	.06	.05	.06
Starch, Corn, Pearl, bgs ...100 lb.	...	4.08	...	4.08	...	3.47
Potato, bgs, cl ...lb.	...	.0637	...	.0637	...	.0637
Rice, bgs ...lb.	no stocks		no stocks		.09½	.10¼
Sweet Potato, bgs ..100 lb.	no stocks		...	.07½	...	.07½
Sulfur, crude, mines ....ton	...	16.00	...	16.00	...	16.00
Flour, USP, precp, bbls, kgs ...lb.	.18	.30	.18	.30	.18	.30
Roll, bbls ...100 lb.	2.40	2.90	2.40	2.90	2.40	2.90
Sulfur Dioxide, liquid, cyl. lb.	.07	.08	.07	.08	.07	.08
tks, wks ...lb.	.04	.06	.04	.06	.04	.06
Talc, crude, c-l, NY ....ton	...	13.00	...	13.00	...	13.00
Ref'd, c-l, NY ....ton	13.00	21.00	13.00	21.00	13.00	21.00
Tin, crystals, bbls, wks ...lb.	no stocks		no stocks		no stocks	
Metal, (*PC*) (A) ...lb.	...	.52	...	.52	...	.52
Toluol, drs, wks ..... gal.	...	.33	...	.33	...	.33
tks, frt all'd (*FP*) ....gal.	...	.28	...	.28	...	.28
Tributyl Phosphate, dms lcl, frt all'd ...lb.	...	.47	...	.47	...	.47
Trichlorethylene, dms, wks lb.	.08	.09	.08	.09	.08	.09
Tricresyl phosphate ..... lb.	.24	.54½	.24	.54½	.24	.54½
Triethylene glycol, dms lcl lb.	...	.26	...	.26	...	.26
Triphenyl Phos, bbls .... lb.	.31	.32	.31	.32	.31	.32
Urea, pure, cases .....lb.	...	.12	...	.12	...	.12
Wax, Bayberry, bgs .....lb.	no stocks		.25	nom.	.25	.26
Bees, bleached, cakes ...lb.	...	.60	...	.60	...	.60
Candelilla, bgs .....lb.	.38	.48	.38	.48	.38	.48
Carnauba, No. 1, yellow, bgs, ton ...lb.	.83¼	.93¼	.83¼	.93¼	.83¼	.93¼
Xylol, frt all'd, tks, wks..gal.	...	.27	...	.27	...	.27
Zinc Chloride fused, wks..lb.	05	.0535	.05	.0535	.05	.0535
Oxide, Amer, bgs, wks lb.	.07¼	.07½	.07	.07½	.07	.07½
Sulfate, crys, bgs, ..100 lb.	3.60	4.35	3.60	4.35	3.60	4.35

Oils and Fats

Babassu, tks, futures ....lb.	...	.111	...	.111	...	.111
Castor, No. 3, bbls .....lb.	.13¾	.14¼	.13¾	.14¼	.13¾	.14¼
China Wood, drs, spot NY lb.	...	.39	...	.39	...	.39
Coconut, edible, drs NY ..lb.	...	.0985	...	.0985	...	.0985
Cod Newfoundland, dms..gal.	...	.88	...	.90	...	.90
Corn, crude, tks, wks ....lb.	...	.12¾	...	.12¾	...	.12¾
Linseed, Raw, dms, c-l ...lb.	...	.1510	...	.1510	...	.1530
Menhaden, tks .....gal.	...	.1225	...	.1225	...	.1225
Light pressed, drs .....lb.	.1208	.1210	.1208	.1307	.1305	.1307
Oiticica, liquid, tks ..... lb.	.21	21¼	.21	.25	...	.25
Oleo, No. 1 bbls, NY ....lb.	.13¾	nom.	.13¾	nom.	.13¾	nom.
Palm, Niger, dms .....lb.	...	.0865	...	.0865	...	.0865
Peanut, crude, tks, f.o.b. wks ...lb.	...	.13	...	.13	...	.18
Perilla, crude dms, NY (A) lb.	no stocks		...	.245	...	.245
Rapeseed, denat, bulk .....lb.	...	.1150	...	.1150	...	.1150
Red, dms .....lb.	.13¾	.14¾	.13¾	.14¾	.13¼	.14¼
Soy Bean, crude, tks, wks lb.	...	.1175	...	.1175	...	.1175
Tallow, acidless, bbls .....lb.	...	.14¼	...	.14¼	...	.14¼
Turkey Red, single, drs ..lb.	.10	.14½	.10	.14½	.10	.14½

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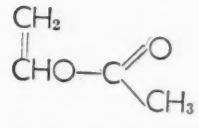

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Canadian Review

(*Continued from page 721*)

not as yet been decided upon, but it is believed that it will be designed to serve a substantial part of the Canadian market.

At present the Dominion is mainly dependent upon the U. S. A. for magnesium sulfate, to the extent of about 4 million pounds per annum, and for some 1.2 million pounds of magnesium oxide. The bulk of the 750,000 pounds of magnesium carbonate consumed originates in Great Britain, with only 80,000 pounds imported from the U. S. A.

Salt Output Doubled

Industrial Minerals Ltd., a subsidiary of Dominion Tar and Chemical Co. Ltd., has just completed the installation of additional vacuum pan evaporators to double its present 50-ton per day common salt output.

This organization, created by Dominion Tar several years ago, is the only Alberta salt producer and its operations are based on extensive, remarkably pure, salt deposits, mined by drilling and water leaching. Total production is marketed in Western Canada.

International Nickel Plans Mill Improvement

International Nickel Co. of Canada Ltd., plans an expenditure of $300,000 for improvement of the Copper Cliff flotation mill which is designed to lower nickel recovery costs.

Government permission has been granted for the installations, but complete plans have not as yet been formulated, or equipment ordered.

Oxalic Acid Pilot Plant

A large scale pilot plant for the production of oxalic acid has been constructed by Canadian Aniline and Extract Co. Ltd., and constitutes the only commercial manufacture of this material in the Dominion. Most of the output will be used by the Company in the preparation of its own line of textile chemicals, with only a small tonnage of oxalic to be sold as such to the general trade.

Primary research work on the sawdust-based process employed, for which patent application has been made, was initiated in 1939. A small pilot plant was built in late 1942 and it is expected that the present development, in which ceramic equipment is used throughout, will be the forerunner of a $150,000 project.

Canadian imports of oxalic from the U. S. A., its sole supplier, totalled 475,000 pounds in 1942.

Consolidated Issues Report

The annual report of Consolidated Mining and Smelting Co. Ltd., reveals that, due to the lack of adequate labor, gross and net profits were both reduced in 1943, with earnings slipping from $3.72 to $2.78 per share.

However, chemical operations were at an unprecedented high level, with sulfuric acid output, for the manufacture of fertilizers, standing at 269,394 tons, or 76,000 tons above 1942.

The unit for the reclamation of elemental sulfur, normally sold to West coast paper mills, was shut down during the year so that sulfuric acid production could be augmented accordingly. Output of ammonium phosphates and ammonium sulfate was greatly increased, although no tonnage figures were released.

Currently Consolidated is capable of turning out 1,000 tons of sulfuric daily, or more than the Dominion's entire production-for-sale output of 1940.

Professionals Excluded From Labor Code

The National Labor Relations Board has ruled that persons employed in a professional capacity do not come under the Government's new labor code covering collective bargaining and arbitration.

The Board heard representations from fourteen professional organizations, including Canadian chemical societies, who asked to be excluded from the code, and acceded to the request that engineers, chemists, architects, and surveyors, do not have to become a party to a collective agreement negotiated by a labor union.

Between the Lines

(*Continued from page 732*)

At present the Bureau has only about four people working on statistics of chemical trade, although some 25 to 30 industries come under this head. In chemicals, generally speaking, and not specifically relating to foreign trade alone, it is now contemplated to issue about 16 industry reports summarizing current developments within specified chemical industries, as well as reports summarizing developments in the chemical field generally.

While the officials quoted here appear to be talking about statistics, what they really are saying is this: In the past two years or more there has been assembled through the much-discussed and cussed questionnaires of one or another of the war agencies, a stupendous volume of trade and industry information, bearing on the chemical, as well as virtually every other major industry of the country.

Before it is too late, before the war ends, it is considered necessary to take stock of all this data, translating it into material that has an active relationship to tangible problems now on the horizon, and screening out the dross. The Bureau of Foreign and Domestic Commerce, in collaboration with other agencies, already is in the preliminary stages of releasing war-time data to business, where it serves a practical purpose.

The purpose at this stage is to assist business executives to understand what has happened to the industrial structure during the war, as a basis on which to plan what they will do when war is over. From this preparatory stage, the next step anticipated now is the determination of what agencies will have a part in the after-war period, in regulation, or in development of post-war industry. And on this ground the jockeying already is under way.

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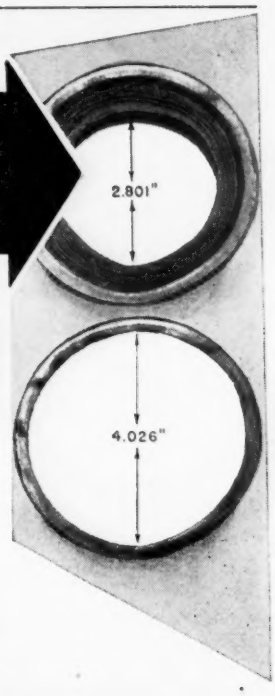

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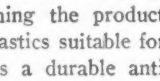
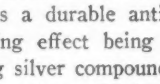
"WE"-EDITORIALLY SPEAKING

THE WAR AGAINST GERMS and bacteria, etc., is growing apace with the development of sulfa drugs, penicillin, and other products. The trend indicates that we're likely to hear much more about this kind of war as time goes on. For instance, we've already heard it said that penicillin might be incorporated in products like shaving cream, toothpaste and other similar products, and not long ago we saw an item concerning the production of self-sterilizing plastics suitable for use as containers or as a durable antiseptic paint. The sterilizing effect being obtained by incorporating silver compounds in the unpolymerized resins. It looks like the lower forms of life are going to have tough going if the humans ever get time to concentrate on this battle against germs instead of going to war against each other.



SPEAKING OF WAR against "bugs" we recently ran across a writeup in a newspaper which said that DDT was capable of killing mosquitoes at a distance of two or three miles through the jungle. Well, DDT (dichloro diphenyl trichloroethane) is certainly a wonderful insecticide which is doing a great job in this war and holds promise for civilian use after the war, but two or three miles is going a bit too far.



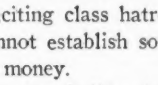
MANY PEOPLE in the chemical field probably know of Ford, Bacon & Davis, the engineering firm which has handled many construction projects, but probably not so many have heard the following interesting anecdote concerning the early start of Ford and Bacon, the original members of the firm.

According to J. V. N. Dorr from whom we picked up the story, the two young engineers were working for the same company when they were 22 and 24 years old respectively and they decided to pool their resources. So, in 1894, they banked $1000 as joint capital, and hustled for jobs, getting the first in a day or two.

It was the golden age of electrification. Davis went to New Orleans to discuss electrifying a mule railroad in the vicinity, and the owner, upon meeting this bright young man, expressed hope of seeing the senior partner. Stating he would come as soon as he could leave other business, Bacon wired Davis to start a beard, and, when he appeared sometime later with high hat, frock coat, and a good beard, he carried the day. It was a case of the right people meeting the right opportunity, for the young firm was soon accepted by industry and has been successful ever since.

WITH "FREE ENTERPRISE" coming up for much discussion these days we thought the following ten points used by H. W. Prentiss, Jr., president of Armstrong Cork Company, in a talk to an AIChE meeting sometime ago, might prove interesting.

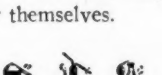
1. You cannot bring about prosperity by discouraging thrift.
2. You cannot strengthen the weak by weakening the strong.
3. You cannot help small men by tearing down big men.
4. You cannot help the poor by destroying the rich.
5. You cannot lift the wage-earner by pulling down the wage-payer.
6. You cannot keep out of trouble by spending more than your income.
7. You cannot further the brotherhood of man by inciting class hatred.
8. You cannot establish sound security on borrowed money.
9. You cannot build character and courage by taking away men's initiative and independence.
10. You cannot help men permanently by doing for them what they could and should do for themselves.



WE RECENTLY ran across a little item, credited to Monsanto Chemical Co., which read:

ALL WARS HAVE COME TO AN END AND SO HAVE SALES BOOMS. THERE WILL BE A TOMORROW WITH ATTENDANT HANGOVER.

As wartime disruptions begin to disappear we'll have to remember this and try to make the hangover as mild as possible. The days of salesmanship and pleasing our customers will be with us again. One way to please our customers is to build good will for the future. Good will is interpreted by the United States Supreme Court as "the desire to return where one has been well treated."



WE NOTICED in a recent report that of the 6,100,000 farms in the United States, about 5,000,000 are without running water; 5,400,000 do not have an indoor toilet; and 5,500,000 have no bathtub. In the light of these statistics for a few products needed by a fraction of the population we can see what huge potential markets still exist in this country even with its so called high standards of living.

Fifteen Years Ago

From Our Files of May, 1929

The American Institute of Chemists presents its medal of honor to Dr. and Mrs. Francis P. Garvan. Dr. Charles H. Herty presided, while speakers included the Hon. John W. Davis, Dr. John J. Abel, and Dr. John J. Finley.

The sixth Chemical Industries Banquet, sponsored by the Salesmen's Association of the American Chemical Industry, features week of the Twelfth Exposition of Chemical Industries in the Grand Central Palace, New York, May 6-11.

The American Chemical Society holds its seventy-seventh meeting at Columbus, Ohio, April 29-May 3. General meetings discuss "Economic Relations Between Chemistry and Farming" and "Molecular Structure." Dr. Garvan is awarded Priestly Medal.

An American I. G. Chemical Corporation is formed with $60,000,000 *assets.*

E. I. du Pont de Nemours & Co., Inc., acquires assets of Krebs Pigment & Chemical Co., Newport, Del. Assets will be transferred to a new company to be organized under the laws of Delaware under the name of the old company. A. S. Krebs will remain as president of new company.

Stockholders of the Union Carbide and Carbon Company approve an increase in the authorized capital stock from 3,000,000 *to* 12,000,000 *shares and the exchange of three new shares for each present share held.*

Industrial activity continued at a high rate during April. Chemical markets generally have been marked by an increasingly stronger tendency since the first of the year; chemical business has been steady and in good volume.

Dr. Claude S. Hudson, chief, chemistry division, Hygienic Laboratory, U. S. Public Health Service, is presented with the eighteenth annual Willard Gibbs Medal, May 25, at a reception and dinner given by the Chicago section, American Chemical Society.

American Institute of Chemists holds annual meeting, at Chemists' Club, New York, May 10, and elects officers.

PART 2: PATENTS AND TRADEMARKS

Abstracts of U. S. Chemical Patents

A Complete Checklist Covering Chemical Products and Processes

Printed copies of patents are available from the Patent Office at 10 cents each. Address the Commissioner of Patents, Washington, D. C., for copies and for general information concerning patents or trade-marks.

From Official Gazette—Vol. 560, Nos. 2, 3, 4—Vol. 561, Nos. 1, 2 (Mar. 14–Apr. 11, '44) p. 493

*Industrial Chemicals—Organic

1,5-Dihydroxy-4-arylaminoanthraquinones. No. 2,341,891. Alexander P. Wuertz and David X. Klein to E. I. du Pont de Nemours & Co.

Composition useful as a gum solvent comprising cyclic ketones boiling above 350° F. having gum solvent properties at elevated temperatures and material boiling below 350° F. having gum solvent properties at normal temperatures. No. 2,341,892. William J. Backoff, Norman D. Williams, John F. O'Loughlin, Harry L. Moir and John S. Yule to The Pure Oil Co.

Polymerizing an acyclic terpene having three double bonds per molecule which comprises contacting said acyclic terpene in liquid phase with a material selected from the group consisting of porous siliceous materials. No. 2,341,948. Alfred L. Rummelsburg to Hercules Powder Co.

Non-aqueous mineral oil composition not normally susceptible to emulsification. No. 2,342,027. Stanley P. Waugh to Tidewater Associated Oil Co.

Removing a suspension of positively charged colloidal particles from glyceride oils. No. 2,342,042. Ralph H. Fash to Anderson, Clayton & Co.

Production of organic halides, which comprises contacting halogen with a saturated organic compound containing a cyclopentyl radical. No. 2,342,072. William A. Bailey, Jr. and Sumner H. McAllister to Shell Development Co.

Hydrocarbon mixture which comprises the branched chain nonylenes 3,5,5-trimethyl hexene-2, 2,4,4-trimethyl hexene-2 and 2,3,4,4-tetramethyl pentene-1. No. 2,342,074. Richard M. Deansly and Aaron Wachter to Shell Development Co.

Conversion of hydrocarbons in the presence of a contact mass. No. 2,342,080. Vladimir A. Kalichevsky to Socony-Vacuum Oil Company, Inc.

Treating gamma-chlorisobutylene, with boron trifluoride at 80° F. and maintaining the mixture at this low temperature for nine days whereby to effect polymerization of the gamma-chlorisobutylene No. 22,446. Vanderveer Boorhees to Standard Oil Co.

Preparation of barium salts of alkyl phenol sulfides. No. 2,342,099 Kenneth Ashley and Elmer Cook to American Cyanamid Co.

Preparing an unsaturated halogenated hydrocarbon, having halogen linked to an unsaturated carbon atom. No. 2,342,100. Oliver Cass to E. I. du Pont de Nemours & Co.

Beta-hydromuconononitrile. No. 2,342,101. Oliver Cass and Arthur Rogers to E. I. du Pont de Nemours & Co.

Composition of matter comprising lubricating oil and a small amount of the monohydric alcohol ester of an acidic adduct which is an alpha-beta ethylenic carboxy acid. No. 2,342,113. Charles Blair, Jr. to Petrolite Corp. Ltd.

Composition of matter, comprising lubricating oil and a relatively small amount of the mono-amino amide of an acidic adduct which is an alpha-beta ethylenic carboxy acid. No. 2,342,114. Charles Blair, Jr. to Petrolite Corp.

Introducing an esterified beta-carboxyethyl group in a monoitroalkane having at least one reactive hydrogen atom attached to carbon atom contiguous to nitro group. No. 2,342,119. Herman Bruson to The Resinous Products & Chemical Co.

Alkylation of hydrocarbons, the method which comprises reacting an alkylatable hydrocarbon with an alkylating agent in a reaction zone containing a solid packing material. No. 2,342,123. Joseph Danforth to Universal Oil Products Co.

Arylamino dihydrobenzofurane. No. 2,342.135. Carlin Gibbs to The B. F. Goodrich Co.

Preserving organic substances, which tend to deteriorate by absorption of oxygen from the air which comprises incorporating therein a compound having this formula. No. 2,342,136. Carlin Gibbs to The B. F. Goodrich Co.

Esters of sulfur containing benzoic acids and process of preparing them. No. 2,342,142. Sidney Harris and William Braker to E. R. Squibb & Sons.

Recovering aliphatic lactones, from pyroligneous acid. No. 2,342,145. Robert Isham and Otto Spring to Danciger Oil & Refineries, Inc.

Etio-cholenic acid derivatives and method of making same. No. 2,342,147. Percy Julian and John Wayne to The Glidden Co.

Wetting composition, comprising an alkali salt of an ester of sulfosuccinic acid from the alkali salts of dihexyl and dioctyl sulfosuccinates urea and a water-soluble glycerine and ethyene glycol. No. 2,342,150. Werner Kleinicke to the Johnson-Marsh Corp.

Halogenating maleic anhydride, which comprises passing a halogen gas into the same in a molten condition in presence of aluminum halide distributed throughout the molten mass. No. 2,342,173. Paul Wise and Charles Milone to Wingfoot Corp.

Water-soluble polyvinyl halogen derivatives. No. 2,342,175. William Wood to Harris-Seybold-Potter.

Preparing gel type plural oxide catalysts of definite composition. No. 2,342,247. Robert Burk to The Standard Oil Co.

Preparation of new bissalicylic acid type compounds from bis-phenols. No. 2,342,294. Joseph Niederl.

Interpolymerization products of vinyl compounds with compounds of group consisting of cyclic imides of olefinic dicarboxylic acids n-alkyl and n-cycloalkyl substitution products thereof. No. 2,342,295. Ludwig Orthner, Heinz Sonke to General Aniline & Film Co.

Bonded abrasive article, comprising a bonded abrasive body, a rigid metal supporting means, and an intermediate cementing layer comprising polychloroprene compounded with a filler such as carbon black. No. 2,342,313. Garret Nimwegen to The Carborundum Co.

Saccharifying starchy materials in the production of alcohol. No. 2,342,330. Leo Christensen to National Agrol Co. Inc.

Dithiocarbamic acid derivative. No. 2,342,332. Russell Dean to American Cyanamid Co.

Composition of matter comprising a synthetic linear polyamide plasticized with a mixture which comprises a solvent plasticizer and a non-solvent plasticizer comprising a completely esterified ester of a carboxylic acid. No. 2,342,370. Henry Richter to E. I. du Pont de Nemours & Co.

Continuous prcoess of polymerizing rosin. No. 2,342,382. Clell Tyler to Hercules Powder Co.

Producing more valuable products from a hydrocarbon mixture containing butanes and propane. No. 2,342,383. Kenneth Uitti to Universal Oil Products Co.

Carbalkoxylation of a nitrile of the type XCH2CN, in which X is selected from hydrogen and aryl alkyl and mixed. No. 2,342,385. Vernon Wallingford and August Homeyer to Mallinckrodt Chemical Works.

Producing solid polymerization products from ethylene. No. 2,342,400. Heinrich Hopff, Siebert Goebel and Curt Rautenstrauch to General Aniline & Film Corp.

Rectifying a moisture laden dehydrating solution. No. 2,342,419. Henry Martin.

Preparing 1-(Tetraacyl-d ribitylamino) 4,5 dimethylbenzene. No. 2,342,438. Max Tishler.

Manufacture of vinyl esters of monocarboxylic acids. No. 2,342,463. Heinrich Fischer and Adolf Freytag to General Aniline & Film Corp.

Preparing hydrobromic acid. No. 2,342,465. Freda Goldschmidt and Friedrich Deutsch.

Molding composition, comprising a uniform mixture of cellulose acetate, camphor, a fire-proofing agent a trialkyl carbinol, and aryl ketone. No. 2,342,478. George Metz.

Aminobutines, containing the amino group attached to carbon atom no. 2 and the triple linkage between carbon atoms nos. 3 and 4 and being substituted in the amino group by an aryl radical. No. 2,342,493. Walter Reppe and Otto Hecht to General Aniline & Film Corp.

Distilling quinone, from passing it into a solution of an organic sulfinic acid in 2-ethoxy ethanol. No. 2,342,538. Carlin Gibbs to The B. F. Goodrich Co.

Improvement agent for hydrocarbon lubricating oils, comprising a heavy metal salt of the p-tertiary amyl phenol diester of dithiophosphoric acid and oil-soluble dialkyl phenol sulfide heavy metal salt. No. 2,342,572. Elmer Cook, William Thomas Jr. to American Cyanamid Co.

Purifying graphite, which has become contaminated by use in the glazing of smokeless powder. No. 2,342,585. Thomas Johnson, Jr., Richard George to E. I. du Pont de Nemours & Co. Inc.

Tertiary aldehydro-carboxylic acid. No. 2,342,607. Herman Bruson and Thomas Riener to The Resinous Products & Chemical Co.

Acylation of lactonitrile. No. 2,342,612. Virgil Hansley to E. I. du Pont de Nemours & Co.

Acylation of lactonitrile. No. 2,342,613. Virgil Hansley to E. I. du Pont de Nemours & Co.

Treating a material synthetically formed by coagulating wtih an acid an alkaline-dispersible acid-coagulable protein dispersion comprising casein. No. 2,342,634. Francis Atwood to National Dairy Products Corp.

Manufacture of phthalocyanines. No. 2,342,663. Norman Haddock to Imperial Chemical Industries Ltd.

Purifying noble gases. No. 2,342,784. Bernhard Berghaus and Wilhelm Burkhardt.

Separation of mineral oils, tars and fractions thereof into oils with a low pour point and into higher and lower melting waxes by dewaxing the basic material in two temperature stages. No. 2,342,798. Karl Fischer.

Improving the water-resistance of a water-sensitive reaction product of a linear polymer-forming composition composed of reacting materials. No. 2,342,823. Paul Schlack.

Aliphatic carbylamines comprising a chain of at least 10 carbon atoms. No. 2,342,794. Henry Dreyfus to Celanese Corp. of America.

Recovering a halogenated hydrocarbon from a halogen containing vapor mixture. No. 2,342,838. Austin Brunjes to The Lummus Co.

Improving the adhesivity of bituminous compositions. No. 2,342,861. Lucien Hemmer to Standard Catalytic Co.

* *Continued from last month (Vol. 559, Nos. 3, 4, 5—Vol. 560, No. 1)*

From Official Gazette—Vol. 560, Nos. 2, 3, 4—Vol. 561, Nos. 1, 2 (Mar. 14–Apr. 11, '44) p. 494

Isomerization process which comprises contacting normal butane, in liquid phase, with aluminum chloride. No. 2,343,922. Joseph Danforth to Universal Oil Products Co

Treating paraffinic distillates boiling in the gasoline range to manufacture isomers. No. 2,342,923. Joseph Danforth to Universal Oil Products Co.

Catalytic dehydrogenation of isopropylbenzene. No. 2,342,980. Herbert Stanley and Francis Salt to The Distillers Co. Ltd.

Composition for production of low temperatures of the order of —79.5° C., which comprises a substantially non-volatile, normally liquid organic substance in solid phase in suspension in said organic substance in liquid phase. No. 2,342,991. Helen Wikoff.

Production of the zein derivative of pseudothiohydantoin which comprises mixing together monochloroacetic acid, ammonium thiocyanate, glycerol-monochlorhydrine and zein, heating the mixture. No. 2,343,012. Oskar Huppert.

Making wood flexible at all temperatures, comprising saturating the wood in an aqueous urea solution and finally resinifying the imbibed urea by subjecting the product to the action of an aldehyde either in the form of a solution or a gas. No. 2,343,016. William Karl Loughborough to the free use of the People in the territory of the U. S.

Lubricating contacting metal parts in metal forming operations, comprising interposing between the contacting parts an aqueous sol including a water soluble pectate. No. 2,343,036. Clarence Walter Wilson to California Fruit Growers Exchange.

Unsulfated glycerol-di-ethers. No. 2,343,053. Adolf Grun to the firm of J. R. Geigy A. G.

Preparing butadiene-1,3. No. 2,343,107. Oliver Cass and Arthur Rogers to E. I. du Pont de Nemours & Co.

Cyclic process for making butadiene. No. 2,343,108. Oliver Cass to E. I. du Pont de Nemours & Co.

Producing the sodium hydroxylate of an aryl aldehyde. No. 2,343,111. Albert Hardman to Wingfoot Corp.

Manufacture of aryl sulfoxides. No. 2,343,162. Josef Vonkennel and Josef Kimmig to Schering Corp.

Recovering phenols, from phenol-containing industrial waste liquids by means of active carbon. No. 2,343,165. Rudolf Adler.

Treatment polyamides. No. 2,343,174. Austin Edison and Winfield Heckert.

Producing acetylene, and lime hydrate by the reaction of calcium carbide and water. No. 2,343,185. Andrew Clifford Holm and Eddie Poirier to Shawiningan Chemicals Ltd.

Preparation of barium salts of dithiophosphoric acid esters. No. 2,343,213. Kenneth Ashley to American Cyanamid Co.

Floating silica, from a non-metallic ore which comprises conditioning an ore pulp with a solution of a condensation product of higher fatty acids with polyalkylene polyamines. No. 2,343,221. Ernest Maust and Clinton Hollingsworth.

Preparing alkylated melamineformaldehyde condensation products. No. 2,343,230. Robert Swain.

Making substantially pure carbon black in the form of round smooth-surfaced aggregates less than one-quarter of an inch in diameter, free from binders and porous throughout. No. 22,454. William Wiegand and Louis Venuto to Binney & Smith Co.

Addition process for the manufacture of fluoro-halogeno hydrocarbons. No. 2,343,252. Anthony Benning to Kinetic Chemicals, Inc.

Condensation of mononitroalkanes and aliphatic ketones. No. 2,343,256. Henry Hass and James Burland to Purdue Research Foundation.

Producing resinous phenol formaldehyde condensation products. No. 2,343,296. Herbert Honel and Alois Zinke.

New article of manufacture the interpolymer of (A) a fatty oil having drying properties and a degree of conjugation not greater than that of dehydrated castor oil with a diester of maleic acid and an alcohol and (B) material selected from class of styrene and vinyl esters of saturated lower fatty acids. No. 2,343,483. Ben Sorenson to E. I. du Pont de Nemours & Co.

Simultaneous oxidation and nitration of cyclo-paraffin hydrocarbons and their alkyl derivatives. No. 2,343,534. Robert Cavanaugh and Wesley Nagle to E. I. du Pont de Nemours & Co.

Hot-aging treatment of maleic anhydride wherein a crude molten mass of maleic anhydride contains chromogenic impurities. No. 2,343,536. Joyce Crowell to Allied Chemical & Dye Corp.

N-carbamyl thiazyl sulfamine. No. 2,343,538. William Ebelke to United States Rubber Co.

New compound, ortho (mercurihydroxy-methoxypropyl) phenoxy acetic acid. No. 2,343,547. Samuel Gordon and Frank Kipnis to Endo Products, Inc.

Recovery of sulfur from a hot homogenous solution having sulfur and tar dissolved therein. No. 2,343,591. Roland Syers to F. W. Berk and Co. Ltd.

Polymerizing a material selected from group of rosin and rosin esters by treatment with a chloride of a metal capable of forming an amphoteric hydroxide. No. 2,343,639. Joseph Borglin to Hercules Powder Co.

Causing conjugation of the double bonds in a fatty polyene substance containing unconjugated double bonds. No. 2,343,644. John Cawley to Distillation Products, Inc.

High vacuum unobstructed path distillation. No. 2,343,666. Kenneth Hickman and John Hecker to Distillation Products, Inc.

Manufacture of conjugated diolefins from monoolefins containing more than three carbon atoms to the molecule. No. 2,343,712. Robert F. Ruthruff.

Petroleum oil conversion with catalysts. No. 2,343,731. James C. Bailie and Melvin J. See to Standard Oil Co.

Hot pressed laminated product comprising a wood veneer and, covering and integrally bonded to a broad face of said veneer, a loosely matter fibrous sheet having a thermosetting resin diffused therethrough. No. 2,343,740. Donald G. Birmingham to Harbor Plywood Corp.

4-Aminostearic acid. No. 2,343,769. Hugh William Gray to E. I. du Pont de Nemours & Co.

Production of 2,5,7,8-tetramethyl-2-(4',8',12'-trimethyl-tridecyl)-6-nitro-chromane. No. 2,343,773. Otto Hromatka to Merck & Co., Inc.

Production of nitrogeneous linear condensation products which comprise subjecting to condensation conditions a diurethane with a bifunctional compound. No. 2,343,808. Paul Schlack to Alien Property Custodian.

Preparing pentadienes. No. 2,343,830. Joy G. Lichty to Wingfoot Corporation.

*Medicinals

Obtaining single hormone of posterior pituitary having oxytocic, pressor and diuresis-inhibiting action. No. 2,342,172. Harry van Dyke Roy Greep to R. E. Squibbs & Sons.

Producing an activated reagent of long-lasting specificity for the diagnostic detection of syphilis. No. 2,342,409. Meyer Levy.

Improving the wash-fastness of sizes with urea derivatives. No. 2,342,785. Louis Bock and Alva Houk to Rohm & Haas Co.

Therapeutic agent for use in connection with the treatment of diseases caused by micro-organisms, comprising sulfathiazole in association with an amino acid selected from group of cysteine and glycine to lower the toxicity of said sulfathiazole. No. 2,342,879. Gustav Martin and Marvin Thompson to William R. Warner & Co., Inc.

Composition adaptable for hypodermical administration consisting essentially of an aqueous solution of a sulfathiazole-methyl glucamine complex, said solution characterized by high therapeutic value. No. 2,342,957. Edmond Moore to Abbott Laboratories.

Amino fatty acid derivatives and their manufacture. No. 2,343,071. Henry Martin, Kurt Glatthaar, and Walter Stammbach to J. R. Geigy A. G.

Local anesthetic product. No. 2,343,198. Marjorie Moore to Abbott Labs.

Recovering riboflavin from adsorbates. No. 2,343,254. Julian Dale to Commercial Solvents Corp.

Halosteroid and preparation of the same. No. 2,343,311. Russell Marker and Harry Crooks, Jr. to Parke, Davis & Co.

Liquid insulin preparation comprising dissolved insulin and insulin precipitate, stabilized by a protein peptizing agent substantially non-toxic to the human system. No. 2,343,625. Harold Abramson and Manuel Gorin to Abrassion, to Gorin and to Galen Co.

*Metals, Alloys

Disintegrating molten metal into globular abrasive material. No. 2,341,704. John F. Ervin.

Recovery of zinc. No. 2,341,805. William A. Ogg.

Separation of nickel, together with cobalt and copper when associated therewith, from ores containing a relatively high percentage of iron. No. 2,341,873. Alan Kissock.

Powder metallurgical process involving compression of metal powders in a die and ejection of resulting compact from the die. No. 2,342,037. George D. Cremer to Hardy Metallurgical Co.

Arc-welding magnesium or the like metal having similarly low temperatures of sagging, ignition and melting. No. 2,342,086. Russell Meredith to Northrop Aircraft, Inc.

Manufacture of light armor plate. No. 2,342,104. Donald Holt to E. I. du Pont de Nemours & Co.

Zinc metallurgy. No. 2,342,368. Agustin Queneau.

Welding rod, comprising an alloy containing lead, nickel impurities not to exceed 0.20% and the balance. No. 2,342,608. Louis Dodd to Magnus Metal Corp.

Treating the surface of zinc and ferrous metals to provide for corrosion resistance. No. 2,342,738. George Jernstedt to Westinghouse Electric & Mfg. Co.

Treating an alloy consisting of one of the base metals Fe, Co, Ni, and containing fractional percentages of Be to develop therein a crystal structure consisting of a fine grained surface area of appreciable depth having relatively wide boundaries overlying a larger grained core area having relatively small boundaries. No. 2,343,038. Victor O. Allen and Joseph F. Polak to Wilbur B. Driver Co.

Electrical resistance alloy characterized by having a temperature coefficient of resistivity below .00014 consisting of chromium Be, Cu, balance Ni. No. 2,343,039. Victor O. Allen and Joseph F. Polak to Wilbur B. Driver Co.

Electrical resistance alloy having a temperature coefficient of resistivity below .00022, consisting of Cr, Fe, Al, Cu and balance Ni. No. 2,343,040. Victor O. Allen and Joseph F. Polak to Wilbur B. Driver Co.

Molybdenum steel alloy containing carbon, chromium, molybdenum, tungsten, vanadium, an element selected from group of columbium, tantalum, titanium, zirconium, cerium and uranium and the balance substantially all iron. No. 2,343,069. George Luerssen and Walter Schlegel to The Carpenter Steel Co.

Permanent magnet comprising chromium, carbon, manganese and the rest iron. No. 2,343,481. Kenneth Scott to Western Electric Co., Inc.

Weld rod for welding together plates of armor, consisting of a ferrous alloy containing carbon and chromium and nickel. No. 2,343,643. Arthur Cape and Charles Foerster to Coast Metals, Inc.

Smelting of copper-lead drosses mattes and the like. No. 2,343,760. Edward P. Fleming and Donald H. McIntosh to American Smelting & Refining Co.

Smelting of copper-lead drosses, mattes and the like. No. 2,343,761. Edward P. Fleming and Donald H. McIntosh to American Smelting & Refining Co.

Production of a metal from a finely divided reducible compound thereof. No. 2,343,780. Warren K. Lewis to Standard Oil Development Co.

* *Continued from last month, (Vol. 559, Nos. 3, 4, 5—Vol. 560; No. 1)*

*Paints, Pigments

Method of dispersing pigments in polyamides. No. 2,341,759. Willard E. Catlin to E. I du Pont de Nemours & Co.

Lowering the paint bodying tendency of a calcium sulfate pigment. No. 2,341,994. Franklin L. Kingsbury and Frank J. Schultz to National Lead Co.

Alkali-resistant iron blue pigment. No. 2,342,429. Irving Shack, and Edwin Wilson to Interchemical Corp.

Titanium oxide pigment production. No. 2,342,483. Carl Marcus Olson to E. I. du Pont de Nemours & Co.

High pigment water-reducible paint, the composition consisting of finely divided solid matter as pigment, slightly acid water as a dispersing medium for said pigment, methyl cellulose colloidally dissolved in water, and oleo-resinous varnish dispersed as an internal dispersed phase in said water and emulsified therein with the aid of methyl cellulose. No. 2,342,581. Gilbert Hoffman to O'Neil-Duro Co.

Crystallizing varnish, which comprises a varnish film-forming ingredient, a solvent therefore and a crystallizer. No. 2,342,590. Joy Lichty to Wingfoot Corp.

Pigment dyeing a fabric while avoiding substantial migration of color on drying which comprises saturating the fabric with a pigmented lacquer-in-water emulsion. No. 2,342,641. Norman Cassel to Interchemical Corp.

Pigment dyeing textiles while avoiding migration of color on drying, which comprises applying to a textile fabric a thin pigmented lacquer-in-water emulsion. No. 2,342,642. Norman Cassel to Interchemical Corp.

Preparation of a varnish drying to a durable, hard, alkali-resistant film which comprises heating prebodied linseed oil with a pentaerythritol-rosin ester. No. 2,343,021. Frank G. Oswald to Hercules Powder Co.

*Paper & Pulp

Preparing an aqueous sizing composition adapted to be added subsequently to papermaking stock. No. 2,343,065. Ralph Kumler and Harold Sinclair to Bennett Inc.

*Petroleum Chemicals

Production of turbine and electrical oils of high stability from a lubricating oil stock of relatively wide boiling range. No. 2,341,874. Lawrence L. Lovell to Shell Development Co.

Compounded oil. No. 2,341,565. Arthur L. Lyman and Lloyd H. Mulit to Standard Oil Co. of California.

Removing mercaptans from hydrocarbon liquids which comprises contacting with a solution containing free alkali metal hydroxide and the reaction product of alkali metal hydroxide and a polyhydroxydiphenyl. No. 2,341,917. Lawrence M. Henderson and George W. Ayers, Jr. to The Pure Oil Co.

Removing mercaptans from hydrocarbon oils which comprises contacting said oils with a solution containing free alkali metal hydroxide and a nuclear halogenated, hydroxylated aromatic hydrocarbon. No. 2,431,918. Lawrence M. Henderson and George W. Ayers, Jr. to The Pure Oil Co.

Process for the dehydrogenation of gaseous and liquid petroleum hydrocarbons, the step of subjecting hydrocarbons to oxygen and an inert gas and at superatmospheric pressures in the presence of a catalyst. No. 2,341,995. Herman B. Kipper.

Production of organic acids by the limited oxidation of hydrocarbons resulting in an oxidation mixture containing both acidic material and hydrocarbons. No. 2,342,028. Carl N. Zellner to Tide Water Associated Oil Company.

Isomerizing hydrocarbons. No. 2,342,073. Harry A. Cheney to Shell Development Co.

Obtaining high yields of alkyl bicyclic aromatic hydrocarbons boiling between 220° C. and 320° C. and alkyl tricyclic aromatic hydrocarbons boiling between 320° C. and 420° C., in substantially pure state, and from an aromatic petroleum stock. No. 2,342,090. Alexander N. Sachanen and Rowland C. Hansford to Socony-Vacuum Oil Co.

Producing more valuable products from normal and branched chain paraffins. No. 2,342,124. Joseph Danforth to Universal Oil Products Co.

Recovering distillate hydrocarbons from high pressure well fluids and for the manufacture of additional amounts of motor fuel hydrocarbons. No. 2,342,165. William Plummer to Standard Oil Co.

Recovering distillate hydrocarbons, from high pressure well fluids and for the production of increased amounts of motor fuel hydrocarbons. No. 2,342,166. William Plummer to Standard Oil Co.

Continuous process for extracting aromatic hydrocarbons, from a hydrocarbon mixture containing aromatic and non-aromatic constituents including paraffins and naphthenes. No. 2,342,205. Robert Manley to The Texas Co.

Catalytic isomerization of olefins. No. 2,342,248. Robert Burk to The Standard Oil Co.

Preparing gel type plural oxide catalysts, of definite composition wherein hydrous gel type plural oxides are precipitated. No. 2,342,249. Robert Burk to The Standard Oil Co.

Improving lubricating oils, of petroleum origin which comprises intimately mixing therewith 1-nitroisobutane. No. 2,342,362. George Oberfell to Phillips Petroleum Co.

Production of branched chain hydrocarbons, by the interaction of isoparaffinic hydrocarbons with normally gaseous olefins in the presence of a sulfuric acid catalyst. No. 2,342,364. Farrand Parker to Union Oil Co. of Calif.

* *Continued from last month (Vol. 559, Nos. 3, 4, 5—Vol. 560, No. 1)*

Recovery of phenols from aqueous caustic liquors containing phenolates, naphthenates and mercaptides derived from a crude caustic-treated petroleum fraction from which neutral oils have been removed. No. 2,342,386. Henry Berger, Edwin Nygaard and Henry Angel to Socony Vacuum Oil Co.

Increasing the production of an oil or gas well comprising introducing an ester of a sulfonated dicarboxylic acid into the well. No. 2,342,424. William Newton Philip Jones to Union Oil Co. of Calif.

Preparing an improvement agent for lubricating oils, from alkylated phenols containing at least one branched chain-alkyl group. No. 2,342,431. Herschel Smith and Troy Cantrell to Gulf Oil Corp.

Preparing an improvement agent for lubricating oils, from monohydric alcohols of the ethylene series. No. 2,342,432. Herschel Smith and Troy Cantrell to Gulf Oil Corp.

Preparing an improvement agent for lubricating oils, from alkylated phenols containing at least one branched chain alkyl group. No. 2,342,433. Herschel Smith and Troy Cantrell to Gulf Oil Corp.

Breaking petroleum emulsions of the water-in-oil type, characterized by subjecting the emulsion to the action of a demulsifying agent. Nos. 2,342,648, 2,342,649. Melvin De Groote to Petrolite Corp., Ltd.

Breaking petroleum emulsions. No. 2,342,650. Melvin De Groote to Petrolite Corp., Ltd.

In the alkylation of isoparaffinic hydrocarbons in the presence of a hydrogen fluoride catalyst, the method of regenerating resulting contaminated catalyst. No. 2,342,677. Carl Linn to Universal Oil Products Co.

Regenerating a cracking catalyst contaminated with 1% or more of a tarry carbonaceous contaminant. No. 2,342,856. Homer Hall to Standard Oil Development Co.

Continuous method for making an activated carbon material from a petroleum coke. No. 2,342,862. Charles Hemminger to Standard Oil Development Co.

Synthesizing hydrocarbons which comprises subjecting a normal paraffin and an olefin to the action of a metal halide catalyst under alkylating conditions and in the presence of a hydrogen halide. No. 2,342,865. Vladimir Ipatieff and Herman Pines to Universal Oil Products Co.

Preparing a metal salt of a phenol sulfide. No. 2,342,887. Joseph Nelson to Standard Oil Development Co.

Combination cracking process for hydrocarbons. No. 2,342,888. Cecil Nysewander and Nathan Fragen to Standard Oil Co.

Isomerization of saturated hydrocarbons. No. 2,343,406. Charles Dryer to Universal Oil Products Co.

Separating components of a complex mixture containing aromatic and non-aromatic carbon compounds having overlapping boiling ranges. No. 2,343,611. John Cope and William Claussen to Standard Oil Co. of Calif.

Conversion of hydrocarbon oil. No. 2,343,649. Gustav Egloff to Universal Oil Products Co.

Separating aromatic hydrocarbons from mixtures of aromatic and non-aromatic hydrocarbons. No. 2,343,744. Robert E. Burk to The Standard Oil Co.

Improved liquid fuel composition comprising a major proportion of a hydrocarbon liquid fuel base blended with a minor proportion of a soluble ester amide of carbonic acid. No. 2,343,766. Peter J. Gaylor to Standard Oil Development Co.

Recovery of spent sulfuric acid alkylation catalyst of about 85 to 92% titratable acidity and containing about 1 to 10% of organic matter, the catalyst having been used for the alkylation of isoparaffins with olefins. No. 2,343,791. John A. O'Dell to Standard Oil Development Co.

Removal of mercaptan compounds from oil which comprises contacting a feed oil with a treating agent comprising an alkali metal hydrozide solution and morpholine. No. 2,343,794. Henry C. Paulsen to Standard Oil Development Co.

*Petroleum Refining

Recovery of relatively volatile hydrocarbons from a hydrocarbon gas. No. 2,341,527. Newcomb K. Chaney to The United Gas Improvement Co.

Increasing the production of an oil or gas well comprising introducing into well a wash liquid consisting of sulfonated mineral oil, and sulfonated vegetable oil. No. 2,342,106. Philip H. Jones and Marcellus Flaxman to Union Oil Co. of Calif.

Drilling fluid for circulation during drilling containing a weighting material and a substantial quantity of an alkali metal alginate. No. 2,342,275. Charles Hedges and Preston Chaney to Sun Oil Co.

Simultaneously refining motor fuel distillate and lubricating oil. No. 2,342,630. William Forney to Cities Service Oil Co.

Well treating fluid consisting of a water-in-oil emulsion comprising a water-washed sludge. No. 2,342,656. Albert Frye and William Dobson to Richfield Oil Corp.

Converting relatively heavy predominantly paraffinic hydrocarbons into relatively light predominantly aromatic high-octane gasoline hydrocarbons. No. 2,342,881. Valentine Mekler to The Lummus Co.

Producing automative and aviation fuels which comprises catalytically cracking hydrocarbon oil. No. 2,342,983. Charles Thomas to Universal Oil Products Co.

Hydrocarbon oil conversion process. No. 2,342,984. Charles Thomas to Universal Oil Products Co.

Effecting the separation of structurally isomeric close-boiling aliphatic olefins of differing degrees of branchedness from one another. No. 2,342,990. Charles Welling to Phillips Petroleum Co.

Treating drilling mud to produce a drilling fluid which will possess desirable viscosity, wall-building and water loss properties. No. 2,343,113. Philip Jones to Union Oil Co. of Calif.

Well treating fluid for disintegrating emulsified asphalt-hydrated clay sheaths containing casein as a stabilizing agent comprising a proteolytic enzyme, a coupling agent a lower member of the fatty acid series and volatile solvent. No. 2,343,136. William Dobson

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and Albert Frye and Alfred Lentz to Richfield Oil Corp.

Treatment of crude petroleum, for the production of gasoline of high anti-knock quality. No. 2,342,192. Wayne Duhn to Texas Co.

Converting hydrocarbon oils wherein said oils are contacted at conversion temperatures with a catalyst consisting essentially of active magnesia and active silica. No. 2,343,295. James Bailie and Melvin See to Standard Oil Co.

Manufacture of nonknocking motor fuels from liquid hydrocarbons by catalytic cracking. No. 2,343,450. Gerhard Free and Wilhelm Funer.

Production of a non-knocking motor fuel. No. 2,343,472. Mathias Pier and Gerhard Free.

Treating hydrocarbons to form gasoline. No. 243,770. Charles E. Hemminger to Standard Oil Development Co.

Removal of aromatics, sulfur, or unsaturates from hydrocarbons. No. 2,343,841. Robert E. Burk to The Standard Oil Co.

Conversion of higher boiling hydrocarbon oils into lower boiling ones. No. 2,343,848. Joseph Mason Barron to The Texas Co.

Producing low boiling aromatic hydrocarbons from hydrocarbon oils heavier than gasoline and containing aliphatics. No. 2,343,851. Aristid V. Grosse and Jacque C. Morrell to Universal Oil Products Co.

Producing low boiling aromatic hydrocarbons from hydrocarbon oils heavier than gasoline and containing aliphatics. No. 2,343,852. Aristid V. Grosse and Jacque C. Morrell to Universal Oil Products Co.

*Photographic Chemicals

Film element comprising a base composed essentially of a fusible, water-insoluble, synthetic linear polymer which has intralinear hetero-atoms and which is capable of being formed into fibers showing by charactteristic X-ray patterns orientation along the fiber axis, having superposed thereon one layer comprising a film forming organic colloid and a phenol. No. 2,341,877. Edmund B. Middleton, David M. McQueen and John R. Hill to E. I. du Pont de Nemours & Co.

Three color photography, which comprises photographing the colored object on a three-layer color-selective photographic material. No. 2,342,152. Ferdinand Leiber.

Preparing cellulose esters, substantially all of the acyl of which consists of fatty acid radicals of at least 10 carbon atoms. No. 2,342,399. Gordon Hiatt and Carlton Crane to Eastman Kodak Co.

Preparing cellulose esters having a high content of fatty acid radicals of 3-4 carbon atoms. No. 2,342,415. Carl Malm to Eastman Kodak Co.

Manufacture of lower fatty acid esters of cellulose. No. 2,342,416. Carl Malm to Eastman Kodak Co.

Photographic silver halide emulsion, containing in sensitizing amounts of dyestuff. No. 2,342,546. John David Kendall to Illford Ltd.

Azo Reversal process of color photography. No. 2,342,620. David Woodward to E. I. du Pont de Nemours & Co.

Azo compounds and material colored therewith. No. 2,342,678. James McNally and Joseph Dickey to Eastman Kodak Co.

Manufacture of silver salide emulsions for color photography. No. 2,343,051. Alfred Frohlich, William Schneider, and Gustav Wilmanns to General Aniline & Film Corp.

Photographic developer containing a water soluble sulfite and as a developing agent the reaction product of a monomethyl amino phenol. No. 2,343,326. Verne Reckmeyer and August Brunner, Jr. to General Aniline & Film Corp.

Subtract color photography. No. 2,343,424. Wilhelm Schneider to General Aniline & Film Corp.

Preparing a photographic peptization emulsion, comprising precipitating silver halide in water, cooling the aqueous precipitate, and mixing it with a hot pectin solution while maintaining the pH below 7. No. 2,343,650. George Fallesen to Eastman Kodak Co.

Stabilizing a mixed fatty acid ester of cellulose of the triester type the acyl of which essentially consists of fatty radicals of 2-4 carbon atoms while in solution in the reaction mixture in which it was prepared which mixture contains sulfuric acid catalyst. No. 2,343,669. William B. Hincke and John Waterman to Eastman Kodak Co.

Hypo eliminator bath for use in the elimination of hypo from photographic silver images comprising alkali metal chlorite. No. 2,343,696. Lowell E. Muehler and George T. Eaton to Eastman Kodak Co.

Color forming photographic developer comprising a primary aromatic amino developing agent and a cyclimino pyrazolone coupler. No. 2,343,702. Henry D. Porter and Arnold D. Weissberger to Eastman Kodak Co.

Pyrazolone coupler for color photography. No. 2,343,703. Henry D. Porter and Arnold Weissberger to Eastman Kodak Co.

Color forming photographic developer comprising a primary aromatic amino developing agent and a 5-amino pyrazolone having a heterocyclic substituent in the 1-position. No. 2,343,704. Henry D. Porter, Paul W. Vittum and Arnold Weissberger to Eastman Kodak Co.

*Resins, Plastics

Tapered oriented artificial bristle comprising a mixture of synthetic linear polyamide and phenolformaldehyde resin. No. 2,341,823. Albert Faris Smith to E. I. du Pont de Nemours & Co.

Manufacture of non-fibrous plastic materials the step comprising treating the plastic material with a suspension of a finely comminuted solid inorganic metal compound. No. 2,341,885. Frank J. Sowa.

Treating fluids and removing an acid-forming constituent therefrom. No. 2,341,907. Harold C. Cheetham and Robert J. Myers to The Resinous Products & Chemical Co.

Composition comprising an acid-curing thermosetting resin carrying a curing agent therefore. No. 2,342,456. Gaetano D'Alelio to General Electric Co.

A gamma acetyl-gamma alkyl pimelic acid. No. 2,342,606. Herman Bruson to the Resinous Products & Chemical Co.

Impregnating fabric sheet material with plastic material. No. 2,342,643. Oren Cessna to The Guardite Corp.

Manufacture of thio-protein plastic, which comprises boiling and agitating a mixture consisting of zein and an aqueous solution of ammonium sulfocyanide and monochloro acetic acid. No. 2,343,011. Oskar Huppert.

Manufacturing a fusible resin-like substance, soluble in certain organic liquids, which consists in producing a reaction between plant bodies initially containing cellulose from which petosan has been removed and at least one material selected from the group consisting of the resin acids of the kind that are found in tall oil. No. 2,343,214. Edward Farber to Polyxor Chemical Co.

Providing a hollow body with a protective lining, the steps including coating the interior of the body with a synthetic-resin lacquer, applying over said coating a sheet of thermo-plastic synthetic resin. No. 2,343,225. Henry Holden Pray and Paul Miller to Youngstown Sheet and Tube Co.

Thermosetting composition comprising a urea-formaldehyde reaction product, cellulosic material and a altent curing catalyst. No. 2,343,247. John Simons to Libbey-Owens-Ford Glass Co.

Thermosetting composition comprising a urea-formaldehyde reaction product, cellulosic material, and o-sulfamido methyl benzoate as a latent accelerator. No. 2,343,497. Rex Cosgrove to Libby-Owens-Ford Glass Co.

Forming a decorative thermoplastic molding material having a nacreous appearance. No. 2,343,658. William Gearhart to Eastman Kodak Co.

Forming sheets or films of light-polarizing material. No. 2,343,775. Edwin H. Land to Polaroid Corp.

Preparing a synthetic resin which comprises reacting a terpene and a phenol in the presence of a molecular compound of boron trifluoride. No. 2,343,845. Paul O. Powers to Armstrong Cork Co.

*Textiles

Reinforcing material comprising woven fabric, a coating of stiffening material on one side of said fabric and a coating of adhesive on the same side of the fabric as said stiffening material. No. 2,341,713. Stanley M. Griswold to B. B. Chemical Co.

Treating textile cellulosic materials to render them heat, acid and alkali resistant which comprises forming a water soluble alkyd resin. No. 2,341,735. Boris Monsaroff to Cosmos Imperial Mills, Ltd.

Elastic water-resistant thread comprising a central core containing polyvinyl alcohol. No. 2,342,098. Sterling Alderfer.

Stiffening fabric, comprising a woven fabric having a weft containing horse hair individually coated with an organic derivative of cellulose. No. 2,342,231. William Whitehead to Celanese Corp.

Imparting water repellent properties to fibrous products. No. 2,342,624. David Aelony to Monsanto Chemical Co.

Making proteinaceous fibers. No. 2,342,994. Francis Atwood to National Dairy Products Corp.

Substantive textile finishing composition adapted for application to textile fibers by a process of exhaustion from a dilute aqueous bath. No. 2,343,089. Joseph Smith to E. I. du Pont de Nemours & Co. Inc.

Substantive textile finishing composition adapted for application to textile fibers. No. 2,343,090. Joseph Smith to E. I. du Pont de Nemours & Co.

Textile finishing composition adapted for sizing and finishing textile fibers. No. 2,343,091. Joseph Smtih to E. I. du Pont de Nemours & Co.

Textile finishing composition adapted for sizing and finishing textile fibers. No. 2,343,092. Joseph Smith to E. I. du Pont de Nemours & Co.

Textile finishing composition. No. 2,343,093. Joseph Smith to E. I. du Pont de Nemours & Co.

Treatment of textiles and composition useful therefor. No. 2,343,094. Joseph Smith to E. I. du Pont de Nemours & Co.

Finishing textile fibers by exhausting thereon a highly dispersed polymerized vinyl compound from a dilute aqueous suspension of the same. No. 2,343,095. Joseph Smith to E. I. du Pont de Nemours & Co.

Package dyeing cellulosic yarn. No. 2,343,233. Willard Watkins and Wilbur Swanson to American Cyanamid Co.

Sizing textile fibers prior to weaving which comprises treating the fiber with a solution of wood rosin in mineral oil. No. 2,343,308. Julius Little to Hercules Powder Co.

*Rubber

Vulcanization product of a rubber composition containing an arylamino dihydrobenzofurane in which arylamino group is a secondary arylamino group attached to benzene ring of benzofurane. No. 2,342,137. Carlin Gibbs to The B. F. Goodrich Co.

Making sponge rubber. No. 2,342,526. Robert Borton to United States Rubber Co.

Vulcanized rubber composition, comprising a rubber which has been vulcanized in presence of a 2-mercapto 4-alkyl 5-carbalkoxythiazole. No. 2,342,545. Paul Jones to The B. F. Goodrich Co.

Polymerized reaction product, of an alkaline tetrasulfide and an allyl compound. No. 2,342,582. George Hooker, Stephen Stowe, and Sylvia Stoesser to Thiokol Corp.

Rubber vulcanization accelerator comprising a mixture of a tetra butyl thiuram monosulfide, a tetra butyl thiourea, and a tetra butyl urea. No. 2,342,870. Albert Laliberte to U. S. Rubber Co.

Obtaining a high concentrate of solids, from an aqueous or other liquid solution. No. 2,343,169. William Shearman Burkhart.

* Continued from last month (Vol. 559, Nos. 3, 4, 5—Vol. 560, No. 1)

Reducing local coagulation of an alkaline latex on the addition of an alkali metal fluosilicate thereto. No. 2,343,541. Roswell Ewart to U. S. Rubber Co.

Reclaiming waste polychloroprenes. No. 2,343,558. Walter Kirby and Paul Elliott to U. S. Rubber Co.

Reclaiming waste polychloroprenes. No. 2,343,559. Walter Kirby and Leo Steinle to U. S. Rubber Co.

Vulcanizing a rubber. No. 2,343,566. Roger Mathes to The B. F. Goodrich Co.

Manufacturing quinones which are volatile at reduced pressure by oxidizing arylamines in an aqueous medium. No. 2,343,768. Carlin F. Gibbs to The B. F. Goodrich Co.

Isolating and recovering pure isobutylene polymers of high molecular weight from a vulcanized composition of said polymers and natural rubber. No. 2,343,816. William J. Sparks, Emile L. Baldeschwieler and Julius V. Sommer.

Rubber hydrochloride containing a photo-chemical inhibitor which is a reaction product of an alkylene polyhalide and a primary aliphatic amine. No. 2,343,834. Winfield Scott to Wingfoot Corp.

Compounding rubber with hard, difficultly dispersible aggregates of a di(arylene-thiazyl* disulfide prepared by oxidizing a 2-mercaptoarylenethiazole by means of nitrous acid which comprises rendering said aggregates susceptible to disaggregation or mechanical working with rubber by treating them with an oily material. No. 2,343,835. Claude H. Smith and Albert J. Gracia to Wingfoot Corp.

*Water, Sewage & Sanitation

Apparatus for removing grease from sewage or analogous liquor. No. 2,342,024. James D. Walker to The American Well Works.

Agricultural Chemicals

Weed-destroying preparation whose active ingredient consists of a water-soluble urea double compound of 2, 6-dichloro-4-nitrophenol. No. 2,344,063. Herbert Schotte and Robert Ebert.

Exterminating agent for animals and insects comprising trichloracetonitrile in admixture with methyl bromide. No. 2,344,105. Gerhard Peters.

Producing sulfated proteins containing in excess of 2 per cent sulfur. No. 2,344,267. Henry Reitz to Claude Wickard, Secretary of Agriculture of the United States of America.

Preparing fungicides and seed disinfectants by introducing a mercury salt into a mixture of tetra-ethyl lead and a polar solvent. No. 2,344,872. Lee Holt to E. I. du Pont de Nemours & Co.

Insecticide in aerosol form comprising ortho-dichlorobenzene and lauric acid. No. 2,345,891. William Sullivan and Lyle Goodhue to Claude Wickard, Secretary of Agriculture of the United States of America.

Insecticide in aerosol form comprising orthodichlorobenzene and diglycol laurate, propylene glycol oleate, propylene glycol laurate, sorbitol laurate or monoglycol laurate. No. 2,345,892. William Sullivan and Lyle Goodhue to Claude Wickard, Secretary of Agriculture of the United States of America.

Insecticide in aerosol form comprising orthodichlorobenzene and spermaceti. No. 2,345,893. William Sullivan and Lyle Goodhue to Claude Wickard, Secretary of Agriculture of the United States of America.

Insecticide in aerosol form comprising oleic acid and methyl chloroacetate, ethyl dichloroacetate, beta-chloroethyl chlorocarbonate, or beta-chloroethylacetate. No. 2,345,894. William Sullivan and Lyle Goodhue to Claude Wickard, Secretary of Agriculture of the United States of America.

Insecticide in aerosol form comprising orthodichlorobenzene and salicyclic acid. No. 2,345,895. William Sullivan and Lyle Goodhue to Claude Wickard, Secretary of Agriculture of the United States of America.

Insecticide in aerosol form comprising 3-chloroacenaphthene and diglycol laurate, propylene glycol oleate, propylene glycol laurate, sorbitol laurate, or monoglycol laurate. No. 2,345,896. William Sullivan and Lyle Goodhue to Claude Wickard, Secretary of Agriculture of the United States of America.

Insecticide in aerosol form comprising 3-chloroacenaphthene and myristic acid. No. 2,345,897. William Sullivan and Lyle Goodhue to Claude Wickard, Secretary of Agriculture of the United States of America.

Insecticide in aerosol form comprising 2-chlorofluorene and diglycol laurate, propylene glycol oleate, propylene glycol laurate, sorbitol laurate, or monoglycol laurate. No. 2,345,898. William Sullivan and Lyle Goodhue to Claude Wickard, Secretary of Agriculture of the United States of America.

Insecticide in aerosol form comprising carbazole and diglycol laurate, propylene glycol oleate, propylene glycol laurate, sorbitol laurate, or monoglycol laurate. No. 2,345,899. William Sullivan and Lyle Goodhue to Claude Wickard, Secretary of Agriculture of the United States of America.

Insecticide in aerosol form comprising carbazole and spermaceti No. 2,345,900. William Sullivan and Lyle Goodhue to Claude Wickard, Secretary of Agriculture of the United States of America.

Insecticide in aerosol form comprising carbazole and salicylic acid. No. 2,345,901. William Sullivan and Lyle Goodhue to Claude Wickard, Secretary of Agriculture of the United States of America.

Insecticide in aerosol form comprising thiocresol and myristic acid. No. 2,345,902. William Sullivan and Lyle Goodhue to Claude Wickard, Secretarfy of Agriculture of the United States of America.

Insecticide in aerosol form comprising thiocresol and diglycol laurate, propylene glycol oleate, propylene glycol laurate, sorbitol laurate, or monoglycol laurate. No. 2,345,903. William Sullivan and Lyle Goodhue to Claude Wickard, Secretary of Agriculture of the United States of America.

Insecticide in aerosol form comprising 3-chlorodibenzofuran and diglycol laurate, propylene glycol oleate, propylene glycol laurate, sorbitol laurate, or monoglycol laurate. No. 2,345,904. William Sullivan and Lyle Goodhue to Claude Wickard, Secretary of Agriculture of the United States of America.

Insecticide in aerosol form comprising oleic acid and thiocresol. No. 2,345,905. William Sullivan and Lyle Goodhue to Claude Wickard, Secretary of Agriculture of the United States of America.

Insecticide in aerosol form comprising lauric acid and an agent. No. 2,345,906. William Sullivan and Lyle Goodhue to Claude Wickard, Secretary of Agriculture of the United States of America.

Insecticide in aerosol form comprising diglycol laurate, propylene glycol oleate, propylene glycol laurate, sorbitol laurate, or monoglycol laurate and methyl chloroacetate, ethyl dichloroacetate, beta-chloroethyl chlorocarbonate, and beta-chloroethylacetate. No. 2,345,907. William Sullivan and Lyle Goodhue to Claude Wickard, Secretary of Agriculture of the United States of America.

Insecticide in aerosol form comprising oleic acid and 3-chloroacenaphthene. No. 2,345,908. William Sullivan and Lyle Goodhue to Claude Wickard, Secretary of Agriculture of the United States of America.

Insecticide in aerosol form comprising lauric acid and 3-chloroacenaphthene. No. 2,345,908. William Sullivan and Lyle Goodhue to Claude Wickard, Secretary of Agriculture of the United States of America.

Increasing feeding value of grass silage and preserving same which comprises incorporating in grass an acid salt from mono-ammonium and di-ammonium phosphates and urea acid phosphate. No. 2,346,072. Sidney Haskell and Edward Harvey to Allied Chemical & Dye Corp.

Insecticidal solution comprising an insecticidal rotenone product dissolved in a solution of cashew nut shell liquid and cashew kernel oil. No. 2,346,256. Mortimer Harvey to The Harvel Corp.

Cellulose

Production of a colored cellulose compound which is insoluble in water, soluble in a water miscible organic liquid, and selected from cellulose esters and ethers. No. 2,343,928. Robert Roberts to Celanese Corp. of America.

Modifying the chemical characteristics of cellulose, which comprises, subjecting the cellulose to periodic acid solution. No. 2,344,411. Richard Reeves to The Chemical Foundation, Inc.

Manufacture of solutions of cellulose in sulfuric acid. No. 2,345,333. Heinrich Fink and Richard Hofstadt.

Ethyl cellulose, in solid solution in roughly equal parts with partially saponified candelilla wax, and constituting a hard, tough, resilient material having a specific gravity of about 0.9 and a tensile strength of 4,000 lbs. per square inch. No. 2,346,136. Stanley Lovell and Harry Straw to Beckwith Manufacturing Co.

Improving organic derivatives of cellulose, which comprises dry pressing cellulose acetate at a pressure from about 10,000 to about 40,000 pounds per square inch to form tablets, and grinding tablets to desired degree of fineness. No. 2,346,210. Bruce Farquhar to E. I. du Pont de Nemours & Co.

A highly acetylated non-fibrous cellulose acetate containing 58.5% of bound acetic acid, originally insoluble in acetone and made soluble in acetone by subjecting a suspension in acetone of said acetate with destroyed fiber structure to a temperature below—20° C. No. 2,346,350. Ernst Berl and Walter Berl.

Stabilizing fatty acid esters of cellulose which comprises stirring a cellulose fatty acid ester selected from (1) the cellulose esters at least some of the fatty acid groups of which have more than two carbon atoms and (2) the partially hydrolyzed cellulose acetates, with a mixture of a water-miscible organic solvent. No. 2,346,498. Carl Malm and Carlton Crane to Eastman Kodak Co.

Ceramics

Material of manufacture having a high degree of pozzolanic activity, comprising a mixture of argillaceous material, and a monovalent alkali material. No. 2,346,451. Mario Palmieri and Arnold Beck, one-half to The Sanitary District of Chicago.

Chemical Specialties

Treating skins or hides of high-fat content. No. 2,343,929. Oliver Robertson to Continental Machinery Co., Inc.

Preserving green or water-laden wood comprising applying to the debarked surface of wood a water-insoluble organic wood preservative as a vehicle carrying in suspension solid particles of a stable, water-soluble mycocide preservative. No. 2,344,019. Enoch Bostrum to Osmose Wood Preserving Co. of America, Inc.

Removing undesirable color, odor and taste bodies from fat-soluble vitamin-containing marine oils. No. 2,344,124. Loran Buxton and Louis Rosenberg to National Oil Products Co.

Non-settling putty comprising a mixture of whiting, linseed oil and metallic soap. No. 2,344,130. Alfred Covert.

Cleaning composition for removing from fabrics dirt adhered thereto by grease which consists of mixture of bentonite, wood flour and a petroleum distillate grease solvent. No. 2,344,268. Henry Rench to Bigelow-Sanford Carpet Co., Inc.

Producing sorel cements. No. 2,344,387. Josef Berlek.

Crankcase lubricant and chemical compound therefor consisting of a solution of a heavy metal salt of the dicapryl ester of dithiophosphoric acid in lubricating oil. No. 2,344,392. Elmer Cook and William Thomas, Jr. to American Cyanamid Co.

Lubricating oil composition comprising a zinc salt of diamyl dithiophosphoric acid and a lubricating oil. No. 2,344,393. Elmer Cook and William Thomas, Jr. to American Cyanamid Co.

Lubricating oil composition. No. 2,344,395. Elmer Cook and William Thomas, Jr. to American Cyanamid Co.

* *Continued from last month (Vol. 559, Nos. 3, 4, 5—Vol. 560, No. 1)*

Light colored coated fabric which is highly resistant to permanent staining by colored cosmetics and foodstuffs. No. 2,344,495 Merle Chamberlin to E. I. du Pont de Nemours & Co.

Lubricant composition to inhibit oxidation 4 of the motor oil. No. 2,344,886. Eugene Lieber to Standard Oil Development Co.

Ternary lubricating oil composition which consists of a tri-p-tolylmethyl polymer in a naphthenic hydrocarbon oil, and a paraffinic mineral lubricating oil. No. 2,344,912. David Young and Hector Evans to Standard Oil Development Co.

Preparing a chewing gum base from milkweed latex. No. 2,344,916. Carl Hartwig and Boris Lougovoy to American Chicle Co.

Stable colloidal lubricant composition suitable for use on dies and tools operating on highly heated metal. No. 2,345,198. Walter Hodson to The Hodson Corp.

Lubricant base composition comprising a stable emulsion of water and a mixture of glycerine mono-ester of a higher fatty acid and an ethanolamine soap of a higher fatty acid. No. 2,345,199. Walter Hodson to The Hodson Corp.

Lubricating oil composition. No. 2,345,239. Elmer Cook and Philip Moss to American Cyanamid Co.

Detergent composition. No. 2,345,307. Emil Vitalis to American Cyanamid Co.

Fungus-resisting composition comprising fiber and "regranulated baked cork." No. 2,345,431. Charles Schuh to Carbide and Carbon Chemicals Corp.

Lubricant composition containing an oil and a sulfur compound and the neutralized phosphorus and sulfur-containing reaction product of a phosphorus sulfide and an olefin. No. 22,464. Charles Kelso and Lawson Mixon to Standard Oil Co.

Making a hydraulic fluid. No. 2,345,585. John Clark and Ralph Van Deventer to Packard Motor Car Co.

Non-aqueous hydraulic fluid comprising glycerine, propylene glycol, isobutanol and borate. No. 2,345,586. John Clark to Packard Motor Car Co.

Sodium silicate detergent composition. No. 2,345,776. Paul Soderberg to Wyandotte Chemicals Corp.

Nongelling bronzing lacquer. No. 2,345,955. Herbert Wampner to Commercial Solvents Corp.

Lubricant for projectiles which contains polyvinyl alcohol and paraffin wax finely dispersed in a fluid medium. No. 2,346,124. Walter Dew to E. I. du Pont de Nemours & Co.

Lubricating oil, having a corrosion index greater than about 40 containing a paraffin wax thiomer to inhibit the corrosive action of said lubricating oil. No. 2,346,156. Bruce Farrington, Victor Kostainsek and George Denison, Jr. to The Standard ADil Co. of Calif.

Chemically seasoning moisture-containing wood involving application thereto of a jellified aqueous solution of urea. No. 2,346,286. Julius Berliner to E. I. du Pont de Nemours & Co.

High temperature lubricant promoting combustion of deposits in the combustion zone of internal combustion engines and producing high stability in the crankcase. No. 2,446,357. Robert Burk and Everett Hughes to The Standard Oil Co.

Heavy duty lubricant comprising a heavy lubricating oil and small amounts of an inorganic phosphorus-providing agent from phosphorus and phosphorus sulfide, and a diaminodiphenylmethane derivative. No. 2,346,356. Robert Burk to The Standard Oil Co.

Spray composition made of water, an effective concentration of an inorganic metallic, finely divided solid substantially water insoluble plant protectant, free oil, a material selected from fatty acid. a fatty acid soap, a fatty acid ester, a partially saponified fatty acid, and a partially esterfied fatty acid. No. 2,346,362. Clarence Dolman to Hercules Glue Co. Ltd.

Putty comprising reclaimed rubber; whiting; linseed oil; and gasoline. No. 2,346,408. Frederick Andrews to The B. F. Goodrich Co.

Oil varnish comprising a rosin acid ester of a member of the group consisting of polypentaerythritols alone and polypentaerythritols in admixture with pentaerythritol, in which the acid groups of the ester consist of abietic acid groups and a drying oil. No. 2,346,409. Gilbert Anderson to Hercules Powder Co.

Thermoplastic lacquer comprising an interpolymer of isobutyl methacrylate and n-butyl methacrylate, a coumarone-indene resin, nitrocellulose, a plasticizer which does not impart taste and odor, and a solvent. No. 2,846,600. Victor Navikas to Armstrong Cork Co.

Finish remover suitable for removing dried coats of paint, varnish and lacquer containing 2-chlorobutene-2, 1,2,3-trichlorobutane, and an aromatic hydrocarbon, and a film-forming compound. No. 2,346,-622. Leo Steck to Shell Development Co.

Coal Tar Chemicals

Process of treating coal. No. 2,346,151. Robert Burk and Einar Kropp to the Standard Oil Co.

Recovering thiophene-free benzene from light oil produced in coal distillation. No. 2,346,524. Heber Von Lauer and George Ponchaud.

Coatings

White vitreous enamel containing as an opaquing agent a zirconium oxide compound having an adsorbed carbon dioxide content. No. 2,343,908. Charles Kinzie and Donald Hake to The Titanium Alloy Manufacturing Co.

Metallic finish enamel comprising a resin, metallic flake, and 12-hydroxystearin. No. 2,343,925. Ralph Pike to E. I. du Pont de Nemours & Co.

Coating composition stabilized against decomposition on heating, comprising an artificial resin containing polymerized vinyl chloride associated with a stabilizing ingredient comprising a resin. No. 2,343,997. George Powell and William McKnight to Carbide and Carbon Chemicals Corp.

Corrosion-protective composition for metals comprising a normally non-gaseous hydrocarbon oil containing dissolved a hydrocarbon wax amine. No. 2,344,016. Alvin Anderson to Shell Development Co.

A pigmented wrinkling enamel composition, comprising resin, metallic drier, raw China-wood oil, boiled linseed oil and solvent thinner. No. 2,344,189. William Waldie to New Wrinkle, Inc.

Crystallizing coating composition. No. 2,344,191. William Waldie to Chemical Developments Corp.

Coating composition for curing freshly placed concrete. No. 2,344,578. George Whitesides.

Composition for coating concrete. No. 2,344,579. George Whitesides.

Protective coating composition comprising a lacquer-making cellulose derivative and an acid ester. No. 2,344,708. Edward Lasher to California Flaxseed Products Co.

Light-colored coating composition comprising an alkyd resin modified with an oil having drying properties, a pigment and a wax. No. 2,344,793. Oscar Tissari to E. I. du Pont de Nemours & Co.

Applying an adherent black coating of carbon to sheet metal. No. 2,344,906. Henry Swanson to Radio Corp. of America.

Water-repellent composition for fabrics. No. 2,344,926. William Thackston and Sivert Glarum to Rohm & Haas Co.

Rendering porous materials water-repellent and waterproof. No. 2,345,142. Adalbert Muller.

Embossing crystalline polymeric material. No. 2,345,629. John Reilly to The Dow Chemical Co.

Nonlivering coating composition. No. 2,345,956. Herbert Wampner to Commercial Solvents Corp.

Coating bath containing phosphoric acid for producing controlled light weight phosphate coatings on zinc surfaces. No. 2,346,302. Noble Hays and George Hoover and Alva Taylor to The American Rolling Mill Co.

Coating suspension for electrodes of electron discharge devices, comprising colloidal particles of insoluble alkaline earth compounds. No. 2,346,553. Joshua Brown, Jr., to Bell Telephone Laboratories, Inc.

Base web or sheet having a water-energizable gum coating on one side and a burnished coating on the opposite side comprising the following ingredients: film-forming binding agent, pigment, wax, and plasticizer. No. 2,346,624. Edwin Straus to Nalco, Inc.

Dyes, Stains

Preparing an indicating dyestuff consisting of treating 1,4-dimethylresorcin with ammonia in the presence of a stronger base. No. 2,344,073. Stephen Wright.

Preparation of dyestuffs of the anthracenic series. No. 2,344,389. Robert Bretagne.

Sulfur dyes of the hydroxy-anilino-naphthalene-sulfonamide type. No. 2,344,624. Herbert Lubs and Newell Bigelow to E. I. du Pont de Nemours & Co.

Coloration of an organic derivative of cellulose textile material. No. 2,344,973. Cyril Croft and Walter Hindle to Celanese Corp. of America.

Dianthrimide-carbazoles which dye cotton from a violet hydrosulfite bath in orange to red shades. No. 2,344,981. William Dettwyler to E. I. du Pont de Nemours & Co.

Production of an azo dye, which comprises coupling a diazotized 6-methoxy-2-amino-benzthiazole with a 3-acyl-amino-1-dihydroxy-alkyl-amino-benzene. No. 2,345,010. George Seymour and Victor Salvin to Celanese Corp. of America.

Dye intermediate, a benzothiazolium aryl quaternary salt. No. 2,345,-093. Leslie Brooker and William Williams to Eastman Kodak Co.

Organic dye. No. 2,345,193. Bela Gaspar to Chromogen, Inc.

Dyestuffs of the azomethine series easily soluble in organic agents being amine salts of complex heavy metal compounds of azomethine compounds. No. 2,345,485. Hans Krzikalla and Helmut Pfitzner and Otto Dornheim to General Aniline & Film Corp.

Stilbene derivatives. No. 2,346,000. Harry Barber to May & Baker, Ltd.

Non-sulfonated azo dye compounds. No. 2,346,013. Joseph Dickey to Eastman Kodak Co.

Dyebath for dyeing wool comprising a water solution of a non-metallized acid wool dye and sufficient hydroxy-acetic acid to give a pH value of about 3 to about 3.5. No 2,346,473. Miles Dahlen and Harry Clapham to E. I. du Pont de Nemours & Co.

Azole disazo dye compounds and their manufacture. No. 2,346,531. Charles Allen and Gordon Frame to Eastman Kodak Co.

Azo dye intermediates. No. 2,346,599. Arthur Murphy, deceased, by Margaret Eastlack, administratrix, and Swanie Rossander and Carlton Croco and John Tinker to E. I. du Pont de Nemours & Co.

Equipment

Device for depicting objects by means of neutrons or x-rays. No. 2,344,043. Hartmut Kallmann and Ernst Kuhn.

Causing luminiscent substances to adhere to glass walls. No. 2,344,-081. Andre Claude.

Making a polarizing filter wherein an optically anisotropic carrier layer is dyed with a substance which imparts a polarizing property to the carrier layer. No. 2,344,117. Otto Vierling and Paul Ganswein.

Transmission film for glass. No. 2,344,250. Frank Jones to Bausch & Lomb Optical Co.

Apparatus for directly producing metals from ores. No. 2,344,440. Julius Lohse.

Preparing a planographic printing plate. No. 2,344,487. Ellis Bassist to William Toland, trustee.

Welding rod coated with a material comprising potassium silicate. No. 2,344,621. Paul Lemmerman to E. I. du Pont de Nemours & Co.

Spectrophotometric particle mixture cam. No. 2,344,748. Edwin Stearns Jr. to American Cyanamid Co.

Apparatus for storing a mixture of liquefied gases at low temperature. No. 2,344,765. Leo Dana and George Zenner to The Linde Air Products Co.

Process and apparatus for fractional distillation. No. 2,344,984. Merrell Fenske to The Pennsylvania Research Corp.

Pipette washing apparatus. No. 2,345,284. Elmer Myers and Earl Beohm.

Apparatus for carrying out catalytic gas reactions. No. 2,345,423. Wilhelm Pfannmuller and Josef Reichart.

Solvent extraction apparatus comprising a U-shaped housing, an endless conveyor in the housing. No. 2,345,626. Ellis Pattee to National Distillers Products Corp.

Apparatus for effecting countercurrent contacting of two incompletely miscible fluids in a series of successive independent zones. No. 2,345,667. Karl Hachmuth to Phillips Petroleum Co.

Apparatus for the treatment of hydrocarbon gases. No. 2,345,774. George Simpson to Delaware Engineering Corp.

Recycling gasoline recovery apparatus. No. 2,345,934. Lon Gregory.

Method of and apparatus for measuring flow characteristics in liquids. No. 2,345,968. Henry Green to Interchemical Corp.

Process and apparatus for curing plastic coatings. No. 2,346,101. Elvin Bright to Plastic Veneering, Inc.

Apparatus for vaporizing liquefied gaseous fuels. No. 2,346,112. Theodore Melsheimer to Parkhill-Wade.

Titration-reaction vessel for the determination of sugars in liquid specimens. No. 2,346,261. Jonas Kamlet to Miles Laboratories, Inc.

Heater for fluids. No. 2,346,345. Charles Angell to Universal Oil Products Co.

Heater for fluids. No. 2,346,348. Marion Barnes to Universal Oil Products Co.

Heater for fluids. No. 2,346,384. Lev Mekler to Universal Oil Products Co.

Producing shrinkable articles capable of use as container closures, sausage casings and the like comprising impregnating a tubular member formed of shrinkable non-fibrous hydrophilic material with an aqueous solution of a hydroscopic plasticizer, drying and impregnated member, printing upon the dried surface and coating the printed surface with a composition comprising a film-forming base. No. 2,346,417. Ralph Cornwell and Charles Rosser and John Yourtee to Sylvania Industrial Corp.

Fractionating apparatus. No. 2,346,443. Wallace McMillan to The Texas Co.

Explosives

Art of making propellent powders the process comprising, treating nitrocellulose powder grains while suspended in water with a solution of nitroglycerine and a deterrent. No. 2,344,516. George McBride to Western Cartridge Co.

Explosive composition containing ammonium nitrate grains coated with a gelatinized explosive nitric ester, containing nitrocotton to which particles of aluminum adhere. No. 2,344,840. Sterling Watt and Norman Adolph to Illinois Powder Manufacturing Co.

Preparing an explosive composition which comprises intimately incorporating a water-soluble nitrate consisting of 60% ammonium nitrate with a small sensitizing proportion of a non-explosive oily material. No. 2,345,582. Claude Carey to Atlas Powder Co.

Ignition mixture containing normal lead 3:5-di-nitro-benzoate, lead styphnate, tetrazene, lead nitrate, and glass. No. 2,345,868. Philip Burdett and Gordon Calhoun to Remington Arms Co. Inc.

Making a granular mixture of explosives trinitrotoluene and pentaerythritol tetranitrate. No. 2,346,116. Walter Snelling to Trojan Powder Co.

Making progressive burning smokeless powder by coating substantially completely colloided smokeless powder grains with a deterrent material. No. 2,346,125. Ellsworth Goodyear to Hercules Powder Co.

Food Chemicals

Making a milk-protein gel dessert which comprises adding to liquid milk a lactone. No. 2,344,090. Louis Huber and Lacey Evans to General Mills, Inc.

Food product comprising cereal protein and admixed source of lysine. No. 2,344,229. Richard Block and Diana Bolling to C. M. Armstrong, Inc.

Treating fatty oils to recover valuble constituents. No. 2,345,097. Loran Buxton to National Oil Products Co.

Saponifying vitamin-containing fatty material. No. 2,345,098. Loran Buxton to National Oil Products Co.

Treating fish livers with a mixture of an organic solvent for the oil and a water-miscible lower aliphatic acid. No. 2,345,099. Loran Buxton to National Oil Products Co.

Partially gelatinized starch and protein mixtures. No. 2,345,322. Ben Buchanan and Robert Lloyd to American Maize-Products Co.

Separating the flavor and aroma compounds from roasted coffee beans. No. 2,345,378. Robert Brandt to Coffee Products Corp.

Producing a dry, vitamin-fortified product. No. 2,345,571. Andre Briod and Loran Buxton to National Oil Products Co.

Obtaining antioxidants from vegetable oil-bearing solids containing natural antioxidants. No. 2,345,5788. Loran Buxton to National Oil Products Co.

Mineral oil stabilized by the presence therein of a natural antioxidant concentrate prepared from vegetable oils and vegetable oil-bearing solids. No. 2,345,580. Loran Buxton to National Oil Products Co.

Refining and stabilizing fat-soluble vitamin-bearing materials. No. 2,345,960. Loran Buxton to National Oil Products Co.

Refining and stabilization of vitamin-containing materials. No. 2,345,961. Loran Buxton to National Oil Products Co.

Recovering cholic acid from other substances associated therewith in the process of isolating cholic acid from bile. No. 2,346,239. Robert Sifferd to Armour & Co.

Industrial Chemicals—Organic

Water resistant reaction product of an antimony compound with a polyvinyl alcohol and an amylaceous substance. No. 2,343,898. Ira Griffin. Dave Truax, and Norman Nuttall to Stein, Hall & Co., Inc.

Vinyl ester stabilized with an anhydrous ammonium salt of an organic carboxylic acid. No. 2,343,950. Allan Berne-Allen, Jr. to E. I. du Pont de Nemours & Co.

Novel furfuryl alcohol-formaldehyde acid condensation resinous product and method for preparing the same. No. 2,343,972. Mortimer Harvey to Harvel Research Corp.

Acid condensation product of formaldehyde and acid condensation polymerization product of furfuryl alcohol and method of preparing the same. No. 2,343,973. Mortimer Harvey to Harvel Research Corp.

Fermenting carbohydrates to produce 2,3 butylene glycol. No. 2,344,025. Leo Christensen to National Agrol Co., Inc.

Production of carbon black. No. 2,344,027. Leonard Conner to Continental Carbon Co.

Preparation of 1-chloro-1-duoro ethylene. No. 2,344,061. Mary Renoll to Monsanto Chemical Co.

Catalytically treating carbonaceous fluid reactants continuously and uniformly with stationary solids catalytic adsorbent contact masses. No. 2,344,103. Cecilio Ocon and Ernest Ocon.

Making a sulfonated material of high SO_3 having a substantial free fatty acid content from an ester type fatty body susceptible of sulfonation selected from the group consisting of oils, fats and waxes. No. 2,344,154. Charles Lighthipe to National Oil Products Co.

Making ethyl ether of dextran which comprises reacting an aqueous alkaline solution of dextran with diethyl sulfate. No. 2,344,179. Grant Stahly and Warner Carlson to Chemical Developments Corp.

Soluble benzyl ether of dextran. No. 2,344,180. Grant Stahly and Warner Carlson to Chemical Developments Corp.

Preparing dibenzyl. No. 2,344,188. Robert Van Schaack, Jr.

Preparation of dextran acetate. No. 2,344,190. William Waldie and John Bersuder to Chemical Developments Corp.

Production of polymerization products from isobutylene. No. 2,344,213. Michael Otto.

Production of isophorone. No. 2,344,226. Seaver Ballard and Vernon Haury to Shell Development Co.

Direct conversion of aromatic nitro compounds to azo compounds. No. 2,344,244. William Freed and Frank Signaigo to E. I. du Pont de Nemours & Co.

Producing diphenyl and benzene. No. 2,344,258. Francis Miles to Monsanto Chemical Co.

Alkali salts of fatty carbamino compounds. No. 2,344,259. Willard Morgan and Earle McLeod to Arnold, Hoffman & Co., Inc.

Alkali salts of fatty amino compounds. No. 2,344,260. Willard Morgan and Earle McLeod to Arnold, Hoffman & Co., Inc.

Condensation products of sulfonic acid amides and sulfonic acid hydrazides and a process of preparing them. No. 2,344,321. Ludwig Orthner, Gerhard Balle, and Heinz Schild to General Aniline & Film Corp.

Corrosion preventing agent comprising a solution of a salt of an ether carboxylic acid in water. No. 2,344,404. Franz Giloy.

Composition of matter comprising a polymeric vinylidine chloride product and stabilizing amounts of a dihalo-ortho-nitro-phenol. No. 2,344,489. Raymond Boyer and Clarence Moyle to The Dow Chemical Co.

Esters of 4-tertiarybutyl-phenoxy-alkylols. No. 2,344,491. Edgar Britton and Gerald Coleman to The Dow Chemical Co.

1-amino-4-(4'-hydroxy-anilino)-naphthalene-6-sulfonamide. No. 2,344,625. Herbert Lubs and Newell Bigelow to E. I. du Pont de Nemours & Co.

Emulsifier for oil in water compositions comprising algin and methyl cellulose. No. 2,344,688. Cyril Folkrod to Valentine Laboratories, Inc.

Reducing a chloropyrimidine and producing 2-amino-pyrimidine. No. 2,344,707. Erwin Kuh to American Cyanamid Co.

Mastic composition comprising a resin base and an inert solid filler. No. 2,344,709. Edward Lasher to California Flaxseed Products Co.

Preparing guanamines. No. 2,344,784. Wilbur Oldham to American Cyanamid Co.

Photopolymerization method. No. 2,344,785. James Owens and Jacob Heerema and George Stanton to The Dow Chemical Co.

Separating salicylaldehyde from a mixture thereof with phenol. No. 2,344,791. Wesley Stoesser to The Dow Chemical Co.

Manufacturing esters of methacrylic acid. No. 2,344,798. Joseph Brown and John Watt to Imperial Chemical Industries, Ltd.

Manufacture of aryloxy-alkylamino butanones. No. 2,344,814. Adolf Grun and Willy Stoll to J. R. Geigy A.G.

Sulfonation product comprising a mixture of a sulfonate and a sulfate obtained by reacting a polymer of an acyclic terpene with a sulfonating agent. No. 2,344,833. Alfred Rummelsburg to Hercules Powder Co.

Process of isomerizing paraffins. No. 2,344,889. Charles Lynch and Jeffrey Bartlett to Standard Oil Development Co.

Preparing permanently plastic resinous polymers of acrylic and methacrylic acids, acrylonitrile, methacrylonitrile and esters of acrylic and methacrylic acids with saturated alcohols. No. 2,344,918. William Johnson to Rohm & Haas Co.

Quaternary salts of dimethylurea monoethers. No. 2,344,934. Herbert West to American Cyanamid Co.

Derivatives of 3,17-diols of the cyclopentano polyhydrophenanthrene series and method for producing the same. No. 2,344,965. Adolf Butenandt and Lothar Strassberger to Schering Corp.

Recovering relatively volatile hydrocarbon material from a gas containing same. No. 2,344,969. Joseph Claffey to The United Gas Improvement Co.

17-aldehydo-androstanes and a process of producing the same. No. 2,344,992. Willy Logemann and Hans Dannenbaum to Schering Corp.

3-derivatives of the saturated and unsaturated androstane-3-one-17-ols substituted in 17-position and process of making same as well as the corresponding free ketones. No. 2,344,997. Karl Miescher to Ciba Pharmaceutical Products, Inc.

Preparing esters which comprises reacting an organic hydroxy compound with a carboxylic acid halide in presence of an amphoteric metal halide. No. 2,345,006. John Ross, Robert Brandt and Joseph Percy to Colgate-Palmolive-Peet Co.

Mercerizing penetrant, composed of a lower phenol and a dialkylated phenol. No. 2,345,036. Arthur DeCastro to National Oil Products Co.

Esters of sulfotricarballylic acids. No. 2,345,041. Walter Ericks and Edmund Meincke to American Cyanamid Co.

Organic cyanine base. No. 2,345,094. Leslie Brooker and Robert Sprague to Eastman Kodak Co.

Producing higher molecular polyenals. No. 2,345,111. Christoph Grundmann.

Producing butadiene. No. 2,345,113. Herbert Guggemos and Alfred Treibs.

Esterifying the olefinic component in a hydrocarbon substance containing saturated and olefinic components by means of an esterifying solution. No. 2,345,114. Henri Guinot.

Water-soluble capillary active compound, the condensation product of ethylene oxide with an imide. No. 2,345,121. Winfrid Hentrich and Alfred Kirstahler.

Manufacture of polymerised alpha-haloacrylic acid ester compositions. No. 2,345,126. Thomas Ireland to Imperial Chemical Industries, Ltd.

Production of glycols and esters thereof by the condensation of aliphatic primary aldehydes with 3 to 6 carbon atoms. No. 2,345,-138. Hans Machemer.

Making acetylenic carbinols. No. 2,345,170. Joseph Zeltner and Michailas Genas.

Preparing a 2-aminothiazoline. No. 2,345,208. Roger Mathes to The B. F. Goodrich Co.

Condensing a 4.5-diamino-pyrimidine with oxalic acid. No. 2,345,-215. Robert Purrmann to Winthrop Chemical Co., Inc.

Manufacture of hydroxy-aldehydes of the saturated and unsaturated cyclopentanopolyhydrophenthrene-series and the esters thereof. No. 2,345,216. Tadeus Reichstein to Roche-Organon, Inc.

Making piperazine compounds. No. 2,345,236. Henry Chitwood to Carbide and Carbon Chemicals Corp.

Piperazino-piperazines. No. 2,345,237. Henry Chitwood and Raymond McNamee to Carbide and Carbon Chemicals Corp.

Recovering solids from distillery slop. No. 2,345,238. Leo Christensen to The Chemical Foundation, Inc.

Treating castor oil to simultaneously dehydrate it and body it. No. 2,345,358. Alfred Rheineck and Samuel Crecelius to Devoe and Raynolds Co., Inc.

Polyiodized derivatives of hydroxy diphenyl carboxylic acids and a process for preparing the same. No. 2,345,384. Max Dohrn and Paul Diedrich to Schering Corp.

Salt of a phenyl dimethyl pyrazolone compound with a sulfonamide compound. No. 2,345,385. Max Dohrn and Paul Diedrich to Schering Corp.

Aliphatic substituted guanidine salts of alkyl esters of pyrophosphoric acid and orthophosphoric acid. No. 2,345,388. Walter Ericks, and James Williams to American Cyanamid Co.

Solvent for organic film-forming materials. No. 2,345,427. Walter Reppe and Otto Hecht and Fritz Oschatz to General Aniline & Film Corp.

Aldehyde condensation products of S-benzyl thioammeline. No. 2,345,456. Herman Bruson to The Resinous Products & Chemical Co.

Sulfo amides of cis-endomethylene 3,6-Δ 4-tetrahydro phthalic acid. No. 2,345,539. Paul McClellan and Jack Bacon to American Cyanamid Co.

Preparing B-norborneol and dinorbornyl ether. No. 2,345,573. Herman Bruson to The Resinous Products & Chemical Co.

Recovery of antioxidants from fatty materials with which they are associated. No. 2,345,576. Loran Buxton to National Oil Products Co.

Refining a fatty material. No. 2,345,577. Loran Buxton to National Oil Products Co.

Formed film-coated article shaped by deformation of a metallic body coated with dried resinous polymer of cyclopentadiene. No. 2,345,583. Newcomb Chaney to The United Gas Improvement Co.

Polyamides having the general formula $R_1CO\text{-}NH\text{-}CH_2\text{-}CH_2\text{-}NH\text{-}CH_2\text{-}CH_2\text{-}NH\text{-}COR_2$ in which R_1CO stands for a fatty acyl radicle containing from 8 to 22 carbon atoms, COR_2 stands for a fatty acyl radicle containing from 2 to 5 carbon atoms. No. 2,345,632. Edwin Robinson and Maurice Kelley to National Oil Products Co.

Manufacture of pyridine-4.5-dicarboxylic acid compounds. No. 2,345,-633. Walter Salzer and Hans Henecka to Winthrop Chemical Co., Inc.

Di-esters of 3,3′-methylenebis (4-hydroxycoumarin) and process of making them. No. 2,345,635. Mark Stahmann and Karl Link to Wisconsin Alumni Research Foundation.

Producing a conjoint polymer of vinyl chloride and vinyl acetate containing a predominant amount of vinyl chloride at a rate of polymerization in excess of about 2.76% monomers polymerized per hour. No. 2,345,660. Alfred Downes and John Kernan to Carbide and Carbon Chemicals Corp.

Manufacture of water-soluble phosphoric acid esters of mono and polyhydroxy aryl compounds of the benzene and naphthalene series. No. 2,345,690. Ulrich Solmssen to Hoffmann-La Roche, Inc.

Production of stable linear condensation polymers. No. 2,345,700. Henry Dreyfus to Celanese Corp. of America.

Nucleated hydrocarbons and method of synthesizing them. No. 2,345,-704. Joseph James to Clarence Byrnes, trustee.

Preparation of a polisobutylene having a molecular weight between 50,000 and 350,000 with a paraffin wax. No. 2,345,717. Luther Turner to Jasco, Inc.

Producing a diolefinic hydrocarbon from isopropyl alcohol. No. 2,345,751. Vladimir Ipatieff to Universal Oil Products Co.

Conversion of carbon monoxide and hydrogen into hydrocarbons containing more than one carbon atom. No. 2,345,957. Gustav Wirth and Hans Laudenklos.

Cultivation of fat-forming molds. No. 2,346,011. Helmut Damm to The Procter & Gamble Co.

Catalyst for hydrocarbon conversion reactions comprising zirconium oxide and a heteropoly fluorine acid. No. 2,346,012. Joseph Danforth to Universal Oil Products Co.

Methacrylate polymer cojoined by cementing action of monomeric methacrylic acid. No. 2,346,036. Richard Leary to E. I. du Pont de Nemours & Co.

Self-emulsifying base suitable for the formation of an oil in water emulsion textile printing paste. No. 2,346,041. Willard Morgan and Norman Vaughn to Arnold, Hoffman & Co., Inc.

Carbalkoxylation of phenylacetic esters. No. 2,346,059. Vernon Wallingford and August Homeyer to Mallinckrodt Chemical Works.

Aqueous poly-disperse system having in the disperse phase discrete particles containing rubber and separate particles of a polymerized plastic mass with limited thermoplasticity. No. 2,346,083. Jack Robinson and Frederick Myers to The Resinous Products & Chemical Co.

Production of isocyanic acid esters. No. 2,346,202. Ernst Waltmann and Edgar Wolf to Heberlein Patent Corp.

Injection molding machine purging composition, comprising a granular mass containing a vinyl resin plasticizer and mildly abrasive filler. No. 2,346,228. Leon Merrill and William Wheeler to Carbide and Carbon Chemicals Corp.

Preparing esters which comprises reacting a compound corresponding to the formula $R\text{-}CH_2\text{-}NO_2$ wherein R is an organic radical undergoing no change, with an alcohol in the presence of a strong acid. No. 2,346,272. Benjamin Pecherer.

Effecting chemical reaction wherein a stream of reactants is passed through a reaction zone containing solid particles maintained in a state of motion in the reaction zone. No. 2,346,294. Joseph Danforth to Universal Oil Products Co.

Inhibiting corrosion of metals in contact with normally liquid aliphatic alcohols which comprises incorporating in alcohol a carbonate having the general formula $XRCO_3$, in which X represents an alkali metal and R represents a radical selected from alkyl and hydroxy alkyl radicals. No. 2,346,295. Hans Duus to E. I. du Pont de Nemours & Co.

Stabilized solid composition of matter, urea containing from 0.0001 to 1.0% by weight of caffeine. No. 2,346,425. Edward Kirkpatrick to E. I. du Pont de Nemours & Co.

Separating lower alkanes and nitric oxide from gaseous reaction products derived from the vapor phase nitration of lower alkanes. No. 2,346,441. Samuel Lippincott to Commercial Solvents Corp.

Surface active agent for the wet treatment of textiles comprising solubilizing compound of the sulfoxy type and an amino dioxane. No. 2,346,454. Hillary Robinette, Jr. to Commercial Solvents Corp.

Manufacture of primary amino-substituted aromatic amides. No. 2,346,492. Arthur Knight and William Stephen to Imperial Chemical Industries, Ltd.

Producing calcium chromate by a chromic acid-calcium hydroxide reaction. No. 2,346,493. Laurence LeBrocq and Henry Cole.

Hydrochlorides of amino-azotoluenes. No. 2,346,508. Graham McGavock to E. I. du Pont de Nemours & Co.

Preparing an alpha-primary amino carboxylicacid which comprises reacting an alkali metal cyanide and an alkali metal salt of an aminomethanesulfonic acid. No. 2,346,547. Witty Anderson, Jr. to E. I. du Pont de Nemours & Co.

Production of sulfonyl bromide derivatives. No. 2,346,568. Arthur Fox to E. I. du Pont de Nemours & Co.

Preparing organic compounds containing carbonyl radicals and sulfonyl radicals which comprises reacting an alicyclic hydrocarbon monocarboxylic acid of 3-11 carbon atoms in the liquid phase with admixed sulfur dioxide and chlorine. No. 2,346,569. Arthur Fox to E. I. du Pont de Nemours & Co.

Allyl ether of diallyl malate. No. 2,346,612. Henry Rothrock to E. I. du Pont de Nemours & Co.

Composition for extinguishing light metal fires which consists of an intimate mixture of granular carbon together with semi-liquid high flash point organic substance unreactive chemically with the burning metal. No. 2,346,627. Richard Thrune to The Dow Chemical Co.

Sheet-like cellulosic carrier coated with an organic disinfecting agent selected from compounds containing at least one quaternary nitrogen atom and one higher alkyl radical fused with a substance containing a carboxylic acid amide group. No. 2,346,632. Eugen Wolfert and Hansheinz Daab to Winthrop Chemical Co., Inc.

Aqueous heat exchange liquid comprising water and a water dispersible nitrated fat sufficient to substantially inhibit corrosion of metals by said liquid. No. 2,346,635. Arthur Pabst and John Prall to Socony-Vacuum Oil Co., Inc.

Industrial Chemicals—Inorganic

Producing a sulfur product suitable for forming an emulsion with water which comprises fusing a mixture of sulfur and asphalt. No. 2,343,860. Isaac Bencowitz to Texas Gulf Sulphur Co.

Production of alkali metal sulfides. No. 2,344,001. Richard Robinson to The Solvay Process Co.

Preparation of ferric oxide of high purity. No. 2,344,004. Charles Six to F. W. Berk & Co., Ltd.

Fired composition comprising diamond dust, aluminum oxide, bentonite and zinc orthosilicate. No. 2,344,024. Bruce Chandler and Henry Yuen to Pfanstiehl Chemical Co.

Manufacture of sodium sulfide by the reduction of sodium sulfate with a solid carbonaceous reducing agent. No. 2,344,104. George Peirce to E. I. du Pont de Nemours & Co.

Brazing flux comprising reaction product of a neutral alkali metal fluoride, alkali metal tetraborate, boric acid and water. No. 2,344,195. Harry Anthony and James Turnbull to Scaife Company.

Hydrolyzing a titanium salt solution. No. 2,344,265. Walter Plechner and Joseph Jarmus to National Lead Co.

Preparing sulfuric acid solutions of titaniferous ores. No. 2,344,288. Roy Dahlstorm to National Lead Co.

Purification of titanium tetrachloride. No. 2,344,319. Walter Meister to National Lead Co.

Preparation of chlorine dioxide. No. 2,344,346. Cyril Evans.

Chemical compounds B-(Meta-hydroxyphenol)-iso-propylamines. No. 2,344,356. Gustav Hildebrandt to E. Bilhuber, Inc.

Barium di (dihydro abietyl) dithiophosphate and the method of making the same. No. 2,344,394. Elmer Cook and William Thomas, Jr. to American Cyanamid Co.

Concentration of sulfuric acid. Mieczyslaw Kalous. No. 2,344,408.

Purifying sulfuric acid solutions from iron compounds. No. 2,344,429. Dirk Willem van Gelder.

Recovering meta-titanic acid from ilmenite or other titaniferous ore. No. 2,344,553. Eric Loth and Carlton Inscho.

Manufacture of sulfuric acid in normal space-chamber systems. No. 2,344,616. Joseph Jenemann and Eldon Hollis to E. I. du Pont de Nemours & Co.

Production of salts by base-exchanging substances. No. 2,344,617. Henry Johnsen.

Preparations for the working of metals containing a base material consisting of water soluble fatty alcohols of 18 carbon atoms. No. 2,344,671. Heinrich Bertsch to American Hyalsol Corp.

Polyvalent metal salt of the condensation product of a material selected from the group consisting of monomers and dimers of acyclic terpenes and a material from group consisting of a-, B-unsaturated organic acids and acid anhydrides. No. 2,344,831. Emil Ott to Hercules Powder Co.

Producing calcium boride. No. 2,344,859. Abraham Fox.

Basic calcium arsenate. No. 2,344,895. George Pearce and Alfred Avens.

Production of sodium nitrate. No. 2,344,929. Dwight Bardwell to The Solvay Process Co.

Bleaching of sponges. No. 2,344,987. Harlow Hyatt to Buffalo Electro-Chemical Co., Inc.

Polyvalent metal salt of a carboxylic acid and of an organic-substituted polybasic, oxygen-containnig, inorganic acid. No. 2,345,061. Gilbert Miles to Colgate-Palmolive-Peet Co.

Extracting aconitic acid from its alkaline earth salts. No. 2,345,079. Emil Ventre, Herbert Henry, and Fred Gayle to Claude Wickard, Secretary of Agriculture of the United States of America.

Producing a composition of matter consisting mainly of sodium aluminate and up to 5% of an organic stabilizing agent. No. 2,345,134. Frederick Lindsay and Benjamin Willey to National Aluminate Corp.

Purifying a substantially anhydrous stannic halide containing a metallic impurity. No. 2,345,214. Alphonse Pechukas to Pittsburgh Plate Glass Co.

Dental impression compound. No. 2,345,255. Charles Gross to The S. S. White Dental Manufacturing Co.

Silvering a glass plate to form a mirror by applying a stannous chlorid solution. No. 2,345,356. William Owen to Pittsburgh Plate Glass Co.

Determining the free alkali content of a fluid salt composition. No. 2,345,465. Gilbert Miles, Conrad Jakob and Joseph Percy to Colgate-Palmolive-Peet Co.

Chromanes and production. No. 2,345,605. Walter John and Philipp Gunther to Merck & Co., Inc.

Preparing para-methyl-alpha methyl styrene from dimethyl tolyl carbinol. No. 2,345,625. Robert Palmer and Carlisle Bibb to Newport, Industries, Inc.

Producing magnesium sulfate from magnesium-bearing rocks. No. 2,345,655. Hellmuth Brandenburg to Idaho Maryland Mines Corp.

Separating hydrochloric acid from hydrofluoric acid. No. 2,345,696. Anthony Benning, Frederick Downing, and Roy Plunkett to Kinetic Chemicals, Inc.

Purification of a crude alkali metal cyanate produced by the oxidation of a molten alkali metal cyanide. No. 2,345,826. Hans Neumark to General Chemical Co.

Free-flowing sulfur. No. 2,345,862. Fairleigh Smith.

Preparing insulating material. No. 2,345,878. Lewis Miller to Keasbey & Mattison Co.

Preparation of rutile titanium oxide pigments from polybasic mineral acid solutions obtained from titanium-bearing materials and which solutions produce anatase titanium oxide normally on hydrolysis. No. 2,345,985. Robert McKinney and Henry Stark to E. I. du Pont de Nemours & Co.

Finding leaks in a pipe line by introducing soluble radioactive material. No. 2,346,043. Karol Mysels to Shell Development Co.

Cyclic process for producting soda ash, from wyoming trona carrying organic matter and contained iron. No. 2,346,140. Robert Pike.

Clarification of industrial acid liquors containing suspended matter which comprises forming, in situ, in such liquor an insoluble colloidal metal sulfide. No. 2,346,320. Walter Moran and Sanford Cole to National Lead Co.

Crystallizing material from solution, which comprises arranging the solution in a plurality of vertically disposed zones, introducing fresh solution of predetermined concentration and temperature into each of said zones, in sufficient quantity to maintain a substantially constant degree of supersaturation introducing seed crystals into a lower zone. No. 2,346,517. John Thompson and Edward Winslow to J. D. and A. B. Spreckels Co.

Removing carbonized oil residue from the surface of magnesium and magnesium-base alloy articles, which comprises subjecting articles to action of an aqueous solution consisting of water and an alkali metal tartrate and an alkali metal hydroxide. No. 2,346,562. Herbert DeLong to The Dow Chemical Co.

Manufacture of alkaline earth metal acid sulfides. Russell Hartman to The Atlantic Refining Co.

Condensing stannic chloride from a vaporized mixture produced by the chlorination of a tin bearing material. No. 2,346,604. Alphonse Pechukas to Pittsburgh Plate Glass Co.

Medicinals

Therapeutically active tetrahydroisoquinoline compounds and process for their production. No. 2,344,095. Fritz Kulz.

Preparing **1-(Substitued alkyl)-5,5-disubstituted barbituric compounds.** No. 2,344,459. Henry Henze to Eli Lilly & Co.

Composition of matter for the chemical fixation of diseased tissue preparatory for surgical removal. No. 2,344,830. Frederic Mohs to Wisconsin Alumni Research Foundation.

Urenone-3 compound. No. 2,345,711. Russell Marker to Parke, Davis & Co.

Extracting lupulin. No. 2,345,773. John Schorr.

Manufacture of aryl-alicyclic fatty acid esters. No. 2,346,027. Karl Hoffman and Leandro Panizzon to Ciba Pharmaceutical Products, Inc.

Producing dialkoxy stilbenes. No. 2,346,048. Ewald Rohrmann to Eli Lilly & Co.

Producing a disubstituted stilbene of predominantly "trans" form. No. 2,346,049. Ewald Rohrmann to Eli Lilly & Co.

Metals, Alloys

Deep hardening silicon titanium steel. No. 2,343,956. Walter Crafts to Electro Metallurgical Co.

Manufacture of non-porous metal articles of high tensile strength and elongation. No. 2,343,978. William Jones.

Regenerating a "spent" noble metal oxide hydrogenation catalyst, supported on an inert, granular, substantially non-porous support material. No. 2,344,208. William Kirkpatrick to Hercules Powder Co.

Charge for an inclined, indirectly heated furnace for the distillation of zinc. No. 2,344,445. Bernard Mansfield to Nassau Smelting & Refining Co., Inc.

Process for obtaining soluble beryllium compounds starting from ores containing beryllium. No. 2,344,480. Carlo Admaoli to Perosa Corp.

Removal of zinc from lead. No. 2,344,629. Walter Menson to The American Metal Co., Ltd.

Quantitative spectrochemical analysis of metal alloys or mixtures for tellurium or other elements present in low concentration. No. 2,344,719. Ralph Nusbaum and James Hackett to General Motors Corp.

Galvanizing of metal sheets or strips by passing a sheet or strip into a bath of molten lead having a pool of molten zinc floating thereon. No. 2,345,058. Elwin Matteson to The Aetna-Standard Engineering Co.

Continuous method of chlorinating a tin oxide bearing ore. No. 2,345,210. Irving Muskat to Pittsburgh Plate Glass Co.

Investment composition suitable for making molds into which high melting point metals and alloys may be cast. No. 2,345,211. Robert Neiman to Edmund Steinbock.

Treating iron containing carbon and elemental silicon to remove the silicon and carbon. No. 2,345,222. Marvin Udy.

Sink-and-float process of separating materials of different specific gravities using a body of heavy suspension stable medium in a separating vessel. No. 2,345,513. Fredrick Trostler and Thomas Andrews and William Skelton.

Ore block consisting of a finely powdered hematite ore. No. 2,346,034. Hobart Kraner to Bethlehem Steel Co.

Producing tungsten containing alloy steel in an electric furnace. No. 2,346,382. Arthur Linz to Climax Molybdenum Co.

Passive aluminum to enabe it to resist attack by hydrogen peroxide which comprises treating it with an aqueous solution of sodium hydrosulfite. No. 2,346,609. Walter Riggs and Rudolf Lehmann to The Pennsylvania Salt Manufacturing Co.

Paints, Pigments

Underwater paint comprising coumarone resin, tetrahydronaphthalene, chlorinated caoutchouc, a repellent consisting of croton oil and methanol-soluble extract thereof, red oxide of iron and charcoal charged with ammonia. No. 2,344,018. Erich Baumheier.

Forming an aqueous slurry of a finely divided pigment adding tall oil thereto. No. 2,345,191. Frederick Gage to Pittsburgh Plate Glass Co.

Mixing an alkaline earth metal pigment in aqueous medium with a deflocculant. No. 2,345,311. Alfred Wilson to S. D. Warren Co.

Incorporating a finely divided solid pigment in a molten synthetic linear polyamide. No. 2,345,533. George Graves to E. I. du Pont de Nemours & Co.

Textile printing paste comprising an inert water-insoluble pigment dispersed in an aqueous oil-in-water type emulsion. No. 2,345,879. Malcolm Moore to Hercules Powder Co.

Producing an uncalcined, anhydrous titanium oxide product of substantially fully-equipped pigment properties including tinting strength. No. 2,345,980. John Keats to E. I. du Pont de Nemours & Co.

Producing improved pigment exhibiting improved gloss properties and freedom from coarse gritty particles. No. 2,346,085. Roscoe Sawyer to E. I. du Pont de Nemours & Co.

Obtaining a rutile titanium oxide pigment through conversion of precipitated anatase. No. 2,346,091. Henry Stark and John Keats to E. I. du Pont de Nemours & Co.

Chemical sensitizing of photographic emulsions with an alkoxy methylene-B-diketone. No. 2,346,095. Arnold Weissberger and Burt Carroll to Eastman Kodak Co.

Producing a pigment, having improved properties which comprises mixing an aqueous slurry of said pigment with a soluble silicate and soluble salt of zirconium. No. 2,346,188. Durant Robertson to the National Lead Co.

Treating a pigment of the group consisting of calcium carbonate, magnesium carbonate, mixed calcium carbonate-magnesium carbonate, and mixed calcium carbonate-magnesium hydroxide. No. 2,346,243. Alfred Wilson to S. D. Warren Co.

Preparing improved pigmentary calcium titanate which comprises forming a reaction mixture of a reactive titanium compound, a reactive calcium compound, an oxide of antimony and magnesia. No. 2,346,296. Helmut Espenschied to National Lead Co.

Chalk resistant titanium dioxide pigment comprising particles of a titanium dioxide pigment intimately associated with a chromium compound resulting from the reaction of a water-soluble chromium salt and an alkaline-reacting precipitating agent, a white water-insoluble metal silicate, and alumina. No. 2,346,322. Walter Nelson to National Lead Co.

Paper and Pulp

Process of treating tall oil to separate fatty acids from rosin acids. No. 2,344,089. Arthur Hixson and Ralph Miller to The Chemical Foundation, Inc.

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Paper container having incorporated therein phosphoric acid in sufficient amount to retard deterioration. No. 2,344,470. Harold Mitchell to Industrial Patents Corp.

Securing a thermoplastic adhesive seal to a wax-impregnated paper body. No. 2,345,852. Carl Langkammerer to Remington Arms Co., Inc.

Petroleum Chemicals

Manufacture of acetylene by the pyrolysis of hydrocarbons. No. 2,343,866. William Hincke to Wulff Process Co.

Manufacturing side chain cyclic and aromatic hydrocarbons from petroleum oil distillates to substantially paraffinic character. No. 2,343,870. William Kaplan to Cities Service Oil Co.

Reacting olefins with paraffin hydrocarbons by maintaining within a reaction zone a reaction mixture containing olefins, paraffin hydrocarbons, a fluid catalyst and reaction products. No. 2,344,015. Ernest Allred to Socony-Vacuum Oil Co.

Producing aromatic hydrocarbons from aliphatic hydrocarbons containing at least six carbon atoms in straight chain arrangement. No. 2,344,318. William Mattox to Universal Oil Products Co.

Treatment of an aliphatic hydrocarbon containing at least six carbon atoms in straight chain arrangement to produce aromatic hydrocarbons therefrom by dehydrogenation and ring closure. No. 2,344,330. John Sturgeon to Universal Oil Products Co.

Treating hydrocarbon fluids. No. 2,344,449. Henry Ogorzaly to Standard Oil Development Co.

Isomerizing normal paraffin hydrocarbons. No. 2,344,466. Kenneth Laughlin to Standard Oil Development Co.

Isomerizing normal paraffin hydrocarbons. No. 2,344,467. Edward Reeves to Standard Oil Development Co.

Alkylating paraffins with olefins. No. 22,458. Arlie O'Kelly and Robert Work to Sacony-Vacuum Oil Co., Inc.

Salts of certain methylene diamines with certain petroleum sulfonic acids. No. 2,344,539. Melvin DeGroote to Petrolite Corp., Ltd.

Destructive hydrogenation of hydrocarbon oils. No. 2,344,789. Louis Schmerling to Universal Oil Products Co.

Reacting one paraffin containing at least four carbon atoms per molecule under isomerization reaction conditions in contact with a catalyst. No. 2,344,890. James Whiteley, Jr. to Standard Oil Development Co.

Converting hydrocarbons. No. 2,344,900. Edward Reeves and Philetus Holt to Standard Oil Development Co.

Sweetening hydrocarbon oils containing mercaptans. No. 2,344,910. George Windle to Standard Oil Co. of California.

Titanium catalyst for hydrocarbon. No. 2,344,911. David Young to Standard Oil Development Co.

Conversion of hydrocarbons. No. 2,344,950. William Shanley to Universal Oil Products Co.

Breaking petroleum emulsions of the water-in-oil type, which consists in subjecting the emulsion to the action of a demulsifier. No. 2,344,976. Melvin DeGroote and Bernhard Keiser to Petrolite Corp., Ltd.

Breaking petroleum emulsions. No. 2,344,977. Melvin DeGroote and Bernhard Keiser to Petrolite Corp., Ltd.

Breaking petroleum emulsions. No. 2,344,978. Melvin DeGroote and Bernhard Keiser to Petrolite Corp., Ltd.

Breaking petroleum emulsions. No. 2,344,979. Melvin DeGroote and Bernhard Keiser to Petrolite Corp., Ltd.

Breaking petroleum emulsions. No. 2,344,980. Melvin DeGroote and Bernhard Keiser to Petrolite Corp., Ltd.

Compounded mineral oil comprising a hydrocarbon lubricating oil, a metal phenate having an oil-solubilizing substituent in an aryl radical thereof, and a hydroxy ester. No. 2,344,988. Frank Kavanagh and James Clayton to Standard Oil Co. of California.

Production of nitrogen bases from a mineral oil of the motor fuel to gas oil boiling range. No. 2,345,005. Chester Read and Amiot Hewlett to Standard Oil Development Co.

Alkylation of hydrocarbons. No. 2,345,095. Frank Bruner, Louis Clarke, and Richard Sawyer to The Texas Co.

Raising the aromatic content of hydrocarbons. No. 2,345,096. Robert Burk and Everett Hughes to The Standard Oil Co.

Conversion of hydrocarbon oils. No. 2,345,129. Wayne Kuhn to The Texas Co.

Regeneration of spent alkylation acids. No. 2,345,506. Ober Slotterbeck to Standard Oil Development Co.

Polymerizing unsaturated hydrocarbons. No. 2,345,574. Robert Burk to The Standard Oil Co.

Alumina gel catalysis. No. 2,345,600. Llewellyn Heard and Rodney Shankland and James Bailie to Standard Oil Co.

Residual hydrocarbon treatment. No. 2,345,603. Eugene Houdry and Harry Broom to Houdry Process Corp.

Catalyst conversion of hydrocarbon oils. No. 2,345,753. Ivar Kinneberg to Universal Oil Products Co.

Synthesis of drying oils from petroleum hydrocarbons. No. 2,345,754. Herman Kipper.

Hydrocarbon conversion process. No. 2,345,785. Gordon Zimmerman to Universal Oil Products Co.

Conversion of a hydrocarbon oil containing asphalt into pitch and a normally liquid hydrocarbon product. No. 2,345,877. Walter Kroenig to Standard Catalytic Co.

Conversion of hydrocarbons. No. 2,345,995. Halsted Warrick to The Texas Co.

Aliphatic unsaturated mono-mercaptan of twelve to eighteen carbon atoms per molecule. No. 2,346,102. Martin de Simo and John O'Connor to Shell Development Co.

Treating oils, which have been partially refined by subjection to the action of preferential solvents for the removal of impurities. No. 2,346,127. Thomas Simpson, John Payne and Peter Valas to Socony-Vacuum Oil Co., Inc.

Compounded oil, comprising a hydrocarbon oil, a high molecular weight dialkyl thioether oxidation inhibitor, and an activator. No. 2,346,153. Georg Denison, Jr. and Paul Condit to Standard Oil Co. of Calif.

Hydrocarbon oil, containing a stabilizing amount of a metal phenate sufficient to inhibit deterioration of the oil and a polyvalent metal salt of an acid of phosphorus containing an organic substituent. No. 2,346,154. Georg Denison, Jr. and Paul Condit to The Standard Oil Co. of Calif.

Compounded oil comprising a hydrocarbon oil, and ether selected from sulfur, selenium and tellurium and a salt of an organo-inorganic acid. No. 2,346,155. George Denison, Jr., and Paul Condit to The Standard Oil Co. of California.

Viscous hydrocarbon oil, containing the oil of polyvalent metal salt of an organic acid, a multibridged thioalkyl compound, a metal salt of an inorganic acid containing an organic substituent. No. 2,346,157. Bruce Farrington, Victor Kostainsek and George Denson, Jr. to The Standard Oil Co. of Calif.

Refining gasoline-containing vapors which comprises continuously passing the vapors through a bed of adsorbed refining agent. No. 2,346,401. William Shanley to Universal Oil Products Co.

Removing mercaptans from sour normally liquid cracked hydrocarbons free from hydrogen sulfide and containing gum forming components, by extraction with a circulating alkali metal hydroxide solution containing an effective amount of a solutizer for mercaptans. No. 2,346,497. Lawrence Lovell, Arthur Martin and Francis Bell to Shell Development Co.

Continuous process of isomerizing hydrocarbons by contact with an isomerization catalyst in the presence of a promoter for the catalyst wherein a stream of hydrocarbons undergoing isomerization passes through a plurality of reaction zones in series. No. 2,346,527. Halsted Warrick and Claude Watson to The Texas Co.

Production of concentrated sodium hydrosulfide solutions. No. 2,346,550. Lawson Border and Edwin Gerhart to Shell Development Co.

Petroleum Refining

Conversion of hydrocarbons of high boiling point into those of lower boiling point. No. 2,343,927. Oscar Roberts to The Atlantic Refining Co.

Hydrocarbon conversion. No. 2,344,290. Roland Day and Elmer Kanhofer to Universal Oil Products Co.

Refining a petroleum lubricating oil fraction. No. 2,344,406. Henry Hibshman to Standard Oil Development Co.

Removal of undesirable sulfur compounds from petroleum oil. No. 2,344,418. Jackson Schonberg to Standard Oil Development Co.

Alkylation process. No. 2,344,469. Sumner McAllister and William Ross to Shell Development Co.

Catalyst regeneration control. No. 2,344,770. Robert Gunness to Standard Oil Co.

Catalytic conversion of hydrocarbons to produce gasoline. No. 2,345,128. Karl Korpi to The Texas Co.

Improved lubricating oil adapted for internal combustion engines, comprising a lubricating oil having incorporated therein a small proportion of polyvalent metal salt of an organic ester of a phosphorus acid. No. 2,345,156. Stiles Roberts to The Texas Co.

Improved aviation gasoline having an octane number above 80, comprising a non-gum-forming hydrocarbon fuel, tetraethyl lead and an aminophenol of the group consisting of monobenzyl-para-aminophenol, isobutyl-para-aminophenol, and normal butyl-para-aminophenol. No. 2,345,296. Walter Schulze and Joseph Lyon, Jr. to Phillips Petroleum Co.

Desulfurizing hydrocarbon oil. No. 2,345,449. Edwin Birkhimer to The Atlantic Refining Co.

Execution of endothermic reactions in the vapor phase with a finely divided solid regenerative catalyst at elevated temperatures. No. 2,345,487. George Liedholm to Shell Development Co.

Cracking hydrocarbon oils. No. 2,345,558. Luis de Florez and James Gray to Gasoline Products Co., Inc.

Preparing gasoline of low gum-forming tendency. Robert Burk and Everett Hughes to The Standard Oil Co.

Hydrocarbon motor fuel stabilized by the presence therein of a natural antioxidant concentrate prepared from vegetable oils and vegetable oil-bearing solids. No. 2,345,579. Loran Buxton to National Oil Products Co.

Treating oils to produce antiknock gasolines or aromatic type liquids. No. 2,345,718. Jesse Walton to Standard Oil Development Co.

Producing high octane motor fuel from the four carbon atom hydrocarbon gases of a cracked stock. No. 2,345,742. Robert Gardner to Sinclair Refining Co.

Gasoline manufacture. No. 2,345,802. Frederick Frey to Phillips Petroleum Co.

Manufacturing substantially-saturated motor fuel hydrocarbons which comprises reacting an isoparaffin with an oxygenated hydrocarbon and the corresponding aliphatic ethers under alkylating conditions in the presence of an alkylation catalyst. No. 2,346,452. Ernest Pevere, Louis Clarke, and George Hatch and Frank Bruner to The Texas Co.

Solvent separation of a feed liquid containing components relatively soluble in, relatively insoluble in, and of intermediate solubility in the solvent to produce an ultimate solvent-free raffinate. No. 2,346,491. Wynkoop Kiersted, Jr. to The Texas Co.

Photographic Chemicals

Hardening photographic gelatin with a diacyl ethylene. No. 2,344,013. Charles Allen and Charles Wilson to Eastman Kodak Co.

Device for the production of visible or photographic images by means of neutrons. No. 2,344,042. Hartmut Kellman and Ernst Kuhn.

Light-sensitive material for color photographic purposes and method of using same. No. 2,344,084. Bela Gaspar to Chromogen, Inc.

Preparation of cellulose acetate propionates and cellulose acetate butyrates having a high propionyl and butyryl content. No. 2,345,406. Carl Malm to Eastman Kodak Co.

Process for continuous-tone printing plates. No. 2,345,447. Ellis Bassist to William Toland.

Self-emulsifying phosphated and phosphited oils as antistatic lubricants. No. 2,345,734. Joseph Dickey and James McNally to Eastman Kodak Co.

Photographic paper having thereon a coating of barium sulfate mixed with a water-susceptible lower fatty acid ester of cellulose and a photographic silver halide emulsion. No. 2,346,008. Halford Clark to Eastman Kodak Co.

Producing neutral tones in gelatino-silver halide emulsions which comprises ripening the emulsion and adding an aryl substituted thiohydantoin. No. 2,346,065. Burt Carroll and Cyril Staud to Eastman Kodak Co.

Toning photographic images. No. 2,346,077. Howard Miller to Eastman Kodak Co.

Antihalation protective layer. No. 2,346,078. Gale Nadeau and Richard Miller to Eastman Kodak Co.

Acylaminohydroxydiphenyl coupler for photography. No. 2,346,080. Henry Porter and Paul Vittum to Eastman Kodak Co.

Photographic bleach-out layer. No. 2,346,090. Henry Staehle to Eastman Kodak Co.

Resins, Plastics

Producing resins of the coumarone-indene type. No. 2,344,026. Edwin Cline to Allied Chemical & Dye Corp.

Producing a plastic composition which comprises polymerizing the ethers of hydroxy-l-butadiene together with maleic anhydride. No. 2,344,085. Paul Halbig and Friedrich Matthias and Alfred Treibs.

Pigmented resin and method of making. No. 2,344,137. Folsom Drummond and William Waldie to Chemical Developments Corp.

Resin comprising a hard, stable, oil-soluble ester of a polypentaerythritol, a rosin acid and an alphabeta unsaturated polycarboxylic acid. No. 2,344,194. Gilbert Anderson to Hercules Powder Co.

Acid-curing thermosetting resin carrying a curing agent therefor comprising a diamino diazinyl substituted-alkyl sulfide. No. 2,344,289. Gaetano D'Alelio and James Underwood to General Electric Co.

Treating a formed article of a crystalline vinylidene chloride polymer possessing orientation parallel to a major surface of the article. No. 2,344,511. Ernest Harder to The Dow Chemical Co.

Producing a resin of the indene styrene-homolog coumarone type. No. 2,344,676. Edwin Cline to Allied Chemical & Dye Corp.

Heat-setting molding composition comprising small particles of glass cloth impregnated with a polymerizable aminoplastic resin. No. 2,344,733. Kurt Ripper to American Cyanamid Co.

Production of hollow shaped products from saponifiable thermoplastic cellulose compounds free from sulfur. No. 2,345,144. Walter Opavsky.

Rosin-drying oil-modified phenol-formaldehyde resin. No. 2,345,357. Paul Powers to Armstrong Cork Co.

Air drying alkyd resin of low acid number consisting of reaction product of diphentaerythritol, a polycarboxylic acid and unsaturated oil fatty acids. No. 2,345,528. Theodore Bradley to American Cyanamid Co.

Cationic melamine-formaldehyde resin solution. No. 2,345,543. Henry Wohnsiedler and Walter Thomas to American Cyanamid Co.

Plugging water formation in wells comprising introducing into formation a liquid composition which consists of a resinous mixture. No. 2,345,611. William Lerch, Clyde Mathis and Eugene Gatchell to Phillips Petroleum Co.

Producing a vinyl resin at a rate of polymerization in excess of 1.6% vinyl monomer polymerized per hour. No. 2,345,659. Alfred Downes to Carbide and Carbon Chemicals Corp.

Preparation of polyvinyl acetal resins. No. 2,345,946. Sidney Overbaugh to E. I. du Pont de Nemours & Co.

Resinous composition obtained from endo-methylene tetrahydrophthalic anhydrides and a polyhydric alcohol component. No. 2,345,948. Fred Pellett to General Electric Co.

Treating crude resin with activated clay to polymerize selectively the dark resin-forming bodies of the polymerizable component of the crude. No. 2,345,962. Edwin Cline to Allied Chemical & Dye Corp.

Liquid, polymerizable resinous composition from furane derivatives capable of being stored for a long period of time in the absence of air without losing its fluid state. No. 2,345,966. Edmond Fiedler and Gustave Holmberg to General Electric Co.

Rendering a methacrylic resin substantially free of elastic properties. No. 2,346,107. William Johnson to Rohm & Haas Co.

Production of resin involving subjecting oil containing one polymerizable resin-forming constituent of coumarone and indene to the action of sulfuric acid polymerization catalyst, neutralizing the oil and distilling the oil to recover the resin. No. 2,346,416. Edwin Cline to Allied Chemical & Dye Corp.

Rubber

Rubber hydrochloride composition containing an open-chain polyalkylene polyamine. No. 2,344,776. George Hulse to United States Rubber Co.

Oxidation of synthetic latex. No. 2,344,843. Victor Wellman to The B. F. Goodrich Co.

Drying water-wet precipitated chlorinated rubber in contact with surfaces consisting essentially of nickel. No. 2,345,507. Earl Smith to Hercules Powder Co.

Phenol-rubber-product containing resinous basic amino nitrogen containing polymer insoluble in water and soluble in organic solvents and acetic acid. No. 2,345,597. Jesse Harmon to E. I. du Pont de Nemours & Co.

Additional patents on rubber, textiles, water sewage and sanitation from the above volumes will be given next month.

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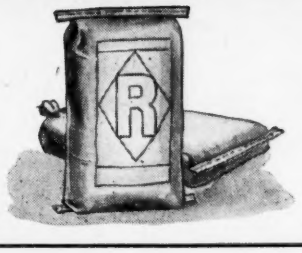

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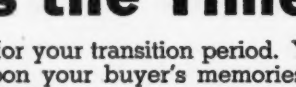

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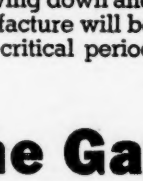
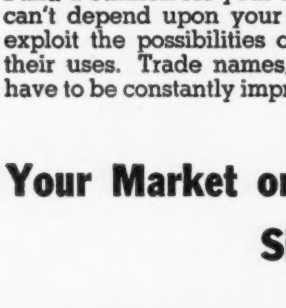
Chemical Industries Buyers Guidebook



The CHEMICAL INDUSTRIES BUYER'S GUIDEBOOK augments CHEMCAL INDUSTRIES, it is the "dictionary" to all seeking sources of and data on Chemicals (formulas uses and how packed), Raw Materials and Specialties (definitions, etc.) of each, as well as complete information on equipment and containers, and a list of trade names.



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Abstracts of Foreign Patents

Collected from Original Sources and Edited

Those interested in obtaining further information concerning the patents reported below should communicate with the Patent Department, CHEMICAL INDUSTRIES. Photostated copies of Canadian patents are available from the Commissioner of Patents, Ottawa, Canada.

CANADIAN PATENTS

Granted and Published April 27, 1943.

Light-sensitive photographic emulsion comprising a silver halide and a carrier therefor selected from the group consisting of the polyvinyl propionaldehyde acetals having a combined vinyl alcohol content of approximately 45-60% and the polyvinyl butyraldehyde acetals having a combined vinyl alcohol content of approximately 60-80%. No. 412,071. Canadian Kodak Company Limited. (Wesley G. Lowe.)

Photographic silver halide emulsion containing a silver halide dispersed by an amino-nitrogen dispersing agent. No. 412,072. Canadian Kodak Company Limited. (Wesley G. Lowe.)

Alloy of in excess of 60% and up to 75% zinc, 2-15% copper and the balance substantially pure manganese, the manganese being present in proportion at least equal to that of the copper. No. 412,079. Chicago Development Company. (Reginald S. Dean.)

Method of producing metals such as calcium and magnesium wherein the metal is liberated as vapor. No. 412,087. The Dow Chemical Company. (John S. Peake and Charles E. Nelson.)

Method of producing substantially pure magnesium. No. 412,088. The Dow Chemical Company. (Charles E. Nelson.)

Process of making butter which comprises adding to cream a small amount of a molecularly dehydrated phosphate of the group consisting of glassy molecularly dehydrated alkali phosphaet and alkali tripolyphosphates in which the molal ratio of alkali oxide to phosphorus pentoxide is between about 0.9:1 and 1.7:1, and churning until butter is produced. No. 412,093. Hall Laboratories, Incorporated. (Charles Schwaltz.)

Process for the production of quaternary ammonium compounds. No. 412,095. Heberlein Patent Corporation. (Edgar Wolf.)

Apparatus and method for coating pipe with cementitious, bituminous or other appropriate plastic material. No. 412,097. Hume Pipe Company (Australia) Limited. (Walter R. Hume.)

Process for continuous manufacture of soap. No. 412,123. The Sharples Corporation. (Ashton T. Scott.)

Process for the manufacture of soap. No. 412,124. The Sharples Corporation. (Ashton T. Scott.)

Method of producing chlorine by the oxidation of hydrogen chloride. No. 412,126. Shell Development Company. (Ludwig Rosenstein.)

Process for improving the fastness to light of materials containing cellulose which have been dyed with water-soluble dyestuffs. No. 412,129. Society of Chemical Industry in Basle. (Charles Graenacher, Carlo Rossi and Heinrich Bruengger.)

Fatty material having incorporated therein green coffee oil. No. 412,131. Standard Brands Incorporated. (William R. Johnston, Herbert C. Gore and Charles N. Frey.)

Stabilized flavoring material containing an aromatic, flavoring and coloring principle of natural fruit origin, and hydroquinone as an oxidation inhibitor. No. 412,132. Standard Brands Incorporated. (William R. Johnston, William E. Stokes, Margaret H. Kennedy and Charles N. Frey.)

Method of controlling the polymerization of iso-olefins in the production of lubricating oils. No. 412,133. Standard Oil Development Company. (Helmuth G. Schneider, Lewis A. Bannon, James M. Whiteley, Jr., and Jeffrey H. Bartlett.)

Heater for fluids. No. 412,148. Universal Oil Products Company. (Marion W. Barnes.)

Apparatus for feeding finely divided matter from a bulk mass. No. 412,155. E. B. & A. C. Whiting Company. (Eric Lundgren.)

Method of preparing methyl vinyl ketone by acetylating 3-chlor-2-butanone and pyrolyzing the resulting product to obtain the methyl vinyl ketone. No. 412,156. Wingfoot Corporation. (John R. Long.)

Rubber hydrochloride film saturated with wax and coated on one side with a thin coating of the wax and on the other side with a heavier coating of the wax, and method for making it. No. 412,157. Wingfoot Corporation. (James E. Snyder.)

Production of anhydrous magnesium chloride. No. 412,169. Lloyd M. Pidgeon.

Process for the conversion of carbon monoxide and hydrogen into hydrocarbons containing more than one carbon atom in the molecule. No. 412,173. I. G. Farbenindustrie A. G. (Gustav Wirth and Hans Laudenklos.)

Process for the conversion of carbon monoxide and hydrogen into hydrocarbons containing more than one carbon atom in the molecule. No. 412,174. Franz Dufschmid. Eduard Linckh and Fritz Winkler.

Process for the catalytic conversion of carbon monoxide and hydrogen into hydrocarbons with more than one carbon atom in the molecule. No. 412,175. Franz Dufschmid, Eduard Linckh and Fritz Winkler.

Granted and Published May 4, 1943.

Porous structure strength increasing process employing hydraulic cement, colloidal silica, alkaline earth metal chloride. No. 412,214. (Louis S. Wertz.)

Vinylidene chloride resin container closure. No. 412,221. Armstrong Cork Co. (E. C. Emanuel).

Preparation of germicidal soap by incorporation of 2, 2′ dihydroxy-halogenated diphenyl methane. No. 412,227. Burton T. Bush Inc. (Eric C. Kunz, Wm. S. Gump).

Electric cable insulation comprising pentaerythitol, monocarboxylic and polycarboxylic acids. No. 412,228. Canadian General Electric Co. (Jas. R. Patterson, Jas. R. Reid, Henry A. Litterton).

Process for continuous electrodeposition of sponge zinc. No. 412,258. Consolidated Mining and Smelting Co. (Wm. Henry Hannay, Basil J. Walsh).

Complex organic phosphate and production method thereof. No. 412,268. Dow Chemical Co. (Clarence L. Moyle).

Dehydration of unsaturated aliphatic cyanides. No. 412,269. Dow Chemical Co. (E. C. Britton, Arthus R. Sexton).

Production of hydrogenated lignin derivatives. No. 412,290. Marathon Paper Mills Co. (Homer Adkins, Guy C. Howard).

Means of protecting ferrous water heating equipment from corrosion. No. 412,322. (Leonard Victor Sutton.)

Manufacture of powdered, dry, lime hydrate. No. 412,325. G. & W. H. Corson Inc. (B. L. Corson).

Method of removing soluble impurities from solid substance, e.g., crystalline magnesium hydroxide. No. 412,334. Heinz Henry Chesny.

Preparation of guanidine salts from cyanamide or dicyandiamide. No. 412,366. American Cyanamid Co. (Wm. H. Hill, Robt. C. Swain, Jos. H. Paden).

Preparation of guanylureau phosphate by reaction of dicyandiamide with phosphoric acid. No. 412,367. American Cyanamid Co. (David W. Jayne Jr., Harold M. Day).

Organic vanadium esters. No. 412,369. American Cyanamid Co. (W. H. Hill).

Production of aliphatic oxynitrile by reaction of nitrile with aliphatic alcohol catalytically. No. 412,371. American Cyanamid Co. (Erwin L. Carpenter).

Process for preparation of clear, stable acid condensation products of ammeline. No. 412,374. American Cyanamid Co. (John M. Grim).

Pest control agent containing neutral organic esters of sulfurous acid. No. 412,380. American Cyanamid Co. (I. Hechenbleikner).

Synthesis of organic acids from carbon monoxide. No. 412,392. Canadian Industries Ltd. (Donald John Loder).

Reacting of non-gaseous hydrocarbon with gaseous sulfur dioxide in presence of Cl and hydrolyzing product in presence of organic amine. No. 412,395. Canadian Industries Ltd. (Wm. S. Calcott, Arthur L. Fox).

Fingernail enamel remover consisting of lanolin, wax, soap, water, and cellulose nitrate solvent. No. 412,396. Canadian Industries Ltd. (Wm. Ferdinand Ochs).

Direct oxidation of aliphatic alcohol to corresponding acid. No. 412,397. Canadian Kodak Co. (David C. Hull).

Preparation of high molecular weight organics by pressure—temperature treatment of ethylene and other polymerizable organics having ethylene unsaturation. No. 412.439. Imperial Chemical Industries (Michael W. Perrin, Eric Wm. Fawcett, John G. Paton, Edmond G. Williams).

Ricinoleic acid compound conversion process entailing heating with **strong alkali.** No. 412,450. National Oil Products Co. (Gifford D. Davis).

Resin preparation by reaction of sulfur dioxide and olefine with silver salt catalyst. No. 412,454. Phillips Petroleum Co. (Louis H. Fitch, Frederick E. Frey).

Manufacture of resinous heteropolymers by reaction of sulfur dioxide with methallyl alcohol in presence of ammonium nitrate catalyst. No. 412,461. Shell Development Co. (Donald M. Leslie).

Prevention of contamination of caustic soda solution by use of anode and weak electric current. No. 412,463. The Solvay Process Co. (Arlie P. Julien, Otto Kay).

Recovery of water soluble vitamins from fish livers. No. 412,487. Whitmoyer Laboratories Inc. (Clarence E. Whitmoyer, Wm. James Moore).

Granted and Published May 18, 1943.

Process for production of chlorine dioxide and chlorine from sodium chloride, sodium chlorate, and sulfuric acid. No. 412,512. (Cyril Harry Evans.)

Protection of animal fibres against moth larvae, mould, and rotting by treatment with chromium fluoride and sodium antimony fluoride. No. 412,526. (Wilfrid Lowe).

Improvement in production of acrolein from propylene. No. 412,536. Acrolein Corp. (Carl M. Herstein).

Recovery of mercaptan from water soluble organic solvent by commingling of mereaptan solvent with large quantities of water. No. 412,542. Atlantic Refining Co. (Leonard N. Leum, Edwin R. Berkhimer).

Coating of vitreous surface with powdered luminescent material deposited from polymerized alkyl alkacrylate-ethyl acetate solution. No. 412,554. Canadian General Electric Co. (L. F. Britten, H. G. Jenkins, A. H. McKeag).

Production of inorganic substituted acetic acid from formaldehyde, inorganic acid, and carbon monoxide. No. 412,564. Canadian Industries Ltd. (Donald John Loder).

Heat resistant, clear, vinyl resin, including vinyl halide polymerized therein, stabilized by lead and cadmium salts of lower fatty acids and alkali metal salts of these acids. No. 412,568. Carbide and Carbon Chemicals Ltd. (Donald M. Young, Wm. M. Quattlebaum Jr.).

Reacting of organic compounds in presence of Friedel-Crafts halide while dsisolved in sulfur dioxide. No. 412,576. Colgate-Palmolive-Peet Co. (John Ross, R. L. Brandt, J. H. Percy).

Process for manufacture of thiocyano-alkyl ethers of nuclear substituted phenols. No. 412,582. Dow Chemical Co. (Gerald H. Coleman, C. L. Moyle, J. E. Livak).

Polymerization and copolymers of vinyl aromatic compound and tung oil. No. 412,585. Dow Chemical Co. (Sylvia M. Stoesser, Arnold R. Gabel).

Insecticidal and fungicidal composition comprising as toxic ingredient a cyclo hexyl amine salt. No. 412,587. Dow Chemical Co. (Edgar C. Britton, Frank B. Smith).

Insecticidal composition employing dibenzyl-disulfide or derivatives as rotenone activator. No. 412,588. Dow Chemical Co. (Robert J. Geary).

Deep hardening of steel by boron addition. No. 412,591. Electro Metallurgical Co. of Canada Ltd. (Walter Crafts).

Purification of phosphoric acid containing iron by electric treatment and beta-napthalene sulfonic acid. No. 412,593. General Chemical Co. (Geo. S. Simpson).

Preparation of crystalline reaction products of ammonia and aldose sugars. No. 421,598. Hercules Powder Co. (E. Jeno Lorand).

Cellulosic textile finishing method employing sodium silicate and sodium chlorite. No. 412,608. Mathieson Alkali Works (Geo. P. Vincent, A. L. Dubeau, J. F. Synan).

Method and apparatus for manufacture of relatively pure titanium carbide in enclosed resistor furnace. No. 412,618. Norton Co. (Raymond Ronald Ridgway).

Insecticidal spray material comprising bentonite, clay, flue cured tobacco dust, nicotine sulfate and light engine oil. No. 412,635. Tobacco By-Products and Chemical Corp. (Robt. B. Arnold).

Iscalloxazine plant growth stimulating media. No. 412,647. Winthrop Chemical Co. Inc. (Fritz Schultz).

Process for production of alkaloid erythratine and hydrohalides thereof. No. 412,656. Merck & Co., Inc. (Karl Folkers, Frank Koniuszy).

Catalytic combination of carbon monoxide and hydrogen to produce hydrocarbons. No. 412,657. (Wilhelm Wenzel, Hans Laudenklor.)

Granted and Published May 25, 1943.

Process for splitting glycerides into glycerine and fatty acids. No. 412,683. (Benjamin H. Thurman.)

Compositions to govern fungicidal plant growth based on thiourea, naphthylacetamide and diluent. No. 412,692. American Chemical Paint Co. (Franklin D. Jones).

Removal of scale from cupreous articles by vapors of volatizable metal halide. No. 412,699. Anaconda Wire and Cable Co. (Wm. H. Bassett Jr., C. J. Snyder, Willis G. MacLelland).

Recovery of sulfur from homogeneous tar-sulfur solution. No. 412,714. F. W. Berk & Co. Ltd. (Roland Syers).

Production of sodium citrate pentahydrate. No. 412,715. California Fruit Growers' Exchange (Homer H. Holton).

Production of butadiene by passing n-butane-chlorine mixture into bath of molten metal chlorides. No. 412,750. Dow Chemical Co. (Chester C. Kennedy, Chs. R. Russell).

Preparation of bactericidal compounds. Phosphoric acid dichloride of 4, amino benzene sulphonyl sulfanilic acid amide. No. 412,765. Hoffman-La Roche Ltd. (Kurt Warnat).

Polymerization and color improvement of rosin with anhydrous zinc chloride. No. 412,781. Newport Industries Inc. (Robt. C. Palmer, Carlisle H. Bibb).

Granted and Published June 1, 1943.

Resin adapted for optical uses comprising copolymer of methyl methacrylate, styrene, and allyl methacrylate. No. 412,875. Canadian Industries Ltd. (Carl E. Barnes).

Optical resin comprised of copolymer of methyl methacrylate, vinyl or isopropinyl formate. No. 412,877. Canadian Industries Ltd. (Carl E. Barnes).

Control of moisture in gelatinous blasting explosives by incorporation of dehydrated borax. No. 412,884. Canadian Industries Ltd. (Vernon Harcourt Williams).

Preparation of 2-chlorobutene-2 from 2, 3 dichlorobutane. No. 412,890. Canadian Industries Ltd. (Oliver Wilfred Cass).

Mothproofing composition containing a chlorinated benzyl phenyl ether. No. 412,891. Canadian Industries Ltd. (A. H. Goddin, N. E. Searle).

Resinous reaction product of butyral of polyvinyl alcohol with hexamethylene. No. 412,893. Canadian Industries Ltd. (Geo. L. Dorough).

Manufacture of light fast white leather by retanning chrome tanned leather with diphenyl ether sulfonic acid-formaldehyde reaction product. No. 412,895. Canadian Industries Ltd. (C. H. Geister, John Thomas Chain).

Metal cleaning composition containing bisulfate, alkyl phenol alkali metal sulfonate, sulfate, and dibasic ammonium phosphate. No. 412,896. Canadian National Carbon Co. Ltd. (Timothy J. Coleman).

Beryllium oxide-silica gel catalyst for hydrocarbon oil conversion. No. 412,965. Standard Oil Development Co. (Gerald C. Connolly).

Granted and Published June 8, 1943.

Casein resin manufacture by inter reaction of casein, urea, in presence of ammonia. No. 412,998. John J. Murray.

A stable, non fusible gel composition. No. 413,021. Canadian General Electric Co. (Winton I. Patnode).

Use of resins for obtaining soft, non-creasing, non-crushing cellulosic textiles. No. 413,028. Canadian Industries Ltd. (Chas. Dunbar).

Production of vinyl esters by reacting acetylene with a carboxylic acid in presence of mercury compound of acetylene disulfonic disulfuric acid. No. 413,051. Carbide and Carbon Chemicals Ltd. (Walter Julius Toussaint).

Cold drawing metal tubes by application of graphite-lithopone-soap coating. No. 413,077. The International Nickel Co. of Canada Ltd. (John L. Gohender, Chas F. Catten Jr.).

Process for preparation of steryl magnesium halide. No. 413,092. Parke, Davis & Co. (Russell Earl Marker).

Polymerization of olefines by catalytic use of copper pyrophosphate. No. 413,092. Polymerization Process Corp. (Robt. F. Ruthruff).

Defibration of lignin-cellulose material by temperature and mechanical processes. No. 413,127. Wood Conversion Co. (C. C. Heritage).

Preparation of methallyl methacrylate from methacrolein and aluminum alcoholate. No. 413,132. Camille Dreyfus (Jos. E. Bludworth).

Granted and Published June 15, 1943.

Skin Ointment consisting of salicylic acid, bismuth subnitrate, bismuth subgallate, mercurochrome solution, and petrolatum. No. 413,150. Wm. H. Glascot.

Detergent composition of alkyl derivatives of aromatic sulfonates. No. 413,166. Allied Chemical and Dye Corp. (Lawrence H. Flett).

Production of ester condensation materials by inter reaction of terpene hydrocarbon of $C_{10}H_{16}$ series with ester of fumaric acid. No. 413,170. American Cyanamid Co. (Theo. F. Bradley, Wm. B. Johnston).

Adhesive composition for bonding rubber to fibrous material, comprising admixture of rubber, carbon black, phenolic-aldehyde resin, and methylene containing hardening agent in organic solvent. No. 413,196. Dominion Rubber Co. Ltd. (Chas. F. Brown, Arthur E. Brooks).

Copolymer of vinyl aromatic compound, oiticica oil, or synthetic oiticica esters, substantially insoluble in common organic solvents. No. 413,198. The Dow Chemical Co. (S. L. Bass, S. M. Stroesser, Robt. D. Lowry).

Removal of lead oxide from polonium plated metals by means of nitric acid. No. 413,207. Firestone Tire and Rubber Co. (John Henry Dillon).

Production of butadiene by catalytic dehydrogenation of gaseous normal butylene. No. 413,223. Jasco Inc. (I. G. Farbenindustrie Aktienegisellschaft (Otto Grossinsky, Nikolaus Rob, Gunthard Hoffman).

Anaesthetic medicinal compound based on ethyl 6-amino nicotinate. No. 413,228. Pyridium Corp. (Birdsey Renshaw).

Process for manufacture of new esters of the hydroxy-stilbene series. No. 413,245. Society of Chemical Industry in Basle (Karl Miescher, Jules Heer).

Manufacture of new esters by treatment of phenolic compound of polyphenyl ethane series, having at least one aliphatic side chain, with esterifying agent. No. 413,246. Society of Chemical Industry in Basle (Karl Miescher, Jules Heer).

Desulfurizing catalyst consisting of cobalt molybdate precipitated on hydrous oxide gel. No. 413,254. Union Oil Co. of California (Alva C. Byrns).

Granted and Published June 22, 1943.

Glyceride oil refining process. No. 413,271. (Benjamin Clayton, Benjamin H. Thurman).

Method of controllably modifying properties of wood pulp. No. 413,273. (Harold Sanford Hill, Jos Edwards).

Method of producing laminated boards. No. 413,280. (Karl Hilding Brosenius.)

Deposit removing device for gas purifying apparatus. No. 413,293. (Karl Torsten Kolle).

Manufacture of heavy magnesium oxide. No. 413,297. (H. MacIntire).

Flux for soldering, welding or brazing aluminum. No. 413,301. (Harry Wm. Mitchell).

Preparation of free cyanamide in liquid ammonia. No. 413,324. American Cyanamid Co. (Harold S. Davis).

Pest control agent based on a-n-amyl cinnamal ethyl cyanoacetate. No. 413,325. American Cyanamid Co. (Wm. Moore).

Production of coloured photographs by means of uranium ferrocyanide, zinc salt and dye. No. 413,369. Latta Syndicate Ltd. (Albert Gilbert Tull).

Preparation of alkyl nitrates. No. 413,385. Sharples Chemicals Inc. (John F. Olin, F. P. Fritsch).

Separation of nitrosyl chloride and chlorine. No. 413,392. Solvay Process Co. (Herman A. Beekhuis Jr.).

Formation of pantothenic acid from beta alanine and yeast. No. 413,395. Standard Brands Inc. (Alfred S. Schultz, Lawrence Atkin).

Granted and Published June 29, 1943.

Method of producing bulk metal base catalysts. No. 413,444. (Marion H. Gwynn.)

Carbohydrate paste for use as separating composition in manufacture of dentures. No. 413,456. (Alan Norris.)
Gelatin capsule design. No. 413,465. (Robt. P. Scherer).
Reactivation of spent hydrogenation metal catalyst. No. 413,472. Allied Chemical and Dye Corp. (Homer E. McNutt).
Guanidine nitrate manufacture from ammonium nitrate and cyanamide salt. No. 413,496. Canadian Industries Ltd. (Robt. Burns, Peter F. Gay).
Condensation process for nuclear alkylation of amino phenols. No. 413,497. Canadian Industries Ltd. (Chas. J. Pedersen, Viktor Weinmoyer).
Alkaline catalytic hydrogenation of formaldehyde. No. 413,498. Canadian Industries Ltd. (Wm. Edward Hanford, R. S. Schreiber).
Manufacture of susbtantially anhydrous acetone. No. 413,513. Carbide and Carbon Chemicals Ltd. (Jas. F. Eversole, Argyle C. Plews).
Manufacture of water insoluble starch adhesive by formaldehyde treatment. No. 413,518. Corn Products Refining Co. (Gerald J. Leuck).
New dialdehyde composition, condensate of stearic amide and monomeric glyoxal. No. 413,534. Heberlein Patent Corp. (Hans Beck).
Polyhydric alcohol preparation from mixture of hydroxy-aldehydes and hydroxy ketones. No. 413,540. Imperial Chemical Industries. (A. G. Hellicar, A. W. C. Taylor, Jas. W. Woolcock.)
Manufacture of plastic material from keratin. No. 413,568 Pilkington Bros. Ltd. (Curt Boas Joseph).
Amino Alcohol manufacturing process. No. 413,572. Sandoz Ltd. (Julius Peyer).

Granted and Published July 6, 1943.

Triethanolamine-oleate oil filter. No. 413,612. (P. E. Halstead.)
A hardenable urea-formaldehyde product mixed with melamine or melamine acetate. No. 413,655. British Industrial Plastics Ltd. (Alfred Brookes).
Process of crimping materials containing synthetic textile fibres. No. 413,665. Carbide and Carbon Chemicals Ltd. (Edward W. Rugeley).
Continuous process for enhancing gloss and transparency of soap. No. 413,693. Lever Bros. and Unilever Ltd. (Thos. Penny).
Production of forgings from high Mg alloys. No. 413,696. Magnesium Elektron Ltd. (Hubert Altwicker).
Sulfur production from gases containing sulfur dioxide. No. 413,716. Pyrites Co. Ltd. (Cyril Thomas Hill).
Thiocarbonates and imino-thiocarbonates of aromatic polyhydroxy compounds. No. 413,762. Georg Werner.

Granted and Published July 13, 1943.

Distributor for fertilizer or insecticides. No. 413,771. Wm. Howard Bunker.
Dustproof switch for electrical machinery. No. 413,782. Harold Thos. Lamb.
Asbestos fiberizing apparatus. No. 413,834. Johnson's Co. (Lee C. Pharo).
Purification of latex by dilute alkali-high temperature treatment. No. 413,895. Gouvernements Lundbouwbedrijven (Hendrik R. Braak).

Granted and Published July 20, 1943.

Apparatus for dehydrating non-metallic inorganics such as clays, salts. No. 413,915. Donald Clark Hart.
Method and apparatus for bulk washing of hydrogel. No. 413,979. Davison Chemical Corp. (Alvin C. Wilson).
Manufacture of MgO of high electrical resistance by heat treatment and quenching. No. 414,014. Norton Co. (Raymond Ronald Ridgway, Archibald H. Ballard).
Oil filter containing salt of an amino acid. No. 414,031. Simmonds Development Corp. Ltd. (Philip Sidney Allan).
Luminous material comprising heat treated combination of manganese-activated zinc silicate and sesquioxide addition. No. 414,056. Gunther Aschermann, Ernst Friederich.

Granted and Published July 27, 1943.

Continuous depth filter apparatus. No. 414,091. Fred W. Manning.
Continuous process for preparation of ammonium thiocyanate from ammonia, HCN and sulfur. No. 414,102. American Cyanamid Co. (Geo. H. Foster, Chas. E. Funk Jr.).
Preparation of acylated cyclopentadiene polymer. No. 414,107. Armour and Co. (A. W. Ralston, J. V. Wol, S. F. Bauer).
Process for hydrogen peroxide manufacture. No. 414,113. Buffalo Electro Chemical Co. Inc. (Max E. Bretschger).
Copolymer of vinylidene chloride. No. 414,123. Dow Chemical Co. (A. W. Hanson, W. G. Goggin).
Production of edible hydrolyzed protein including amino acids for flavouring meat base products. No. 414,132. Griffith Laboratories, Ltd. (Lloyd A. Hall).
Metal melting and casting apparatus. No. 414,142. Magnesium Elektron Ltd. (Erie Crisp Lewis).
Electrolytic process for manganese extraction. No. 414,145. Metallic Manganese Co. Ltd. (S. M. Shelton).
Manufacture of monoalkyl derivatives of urea. No. 414,158. Sharples Chemicals Inc. (John Frank Olin).
Electrostatic separation of cement raw materials. No. 414,161. F. L. Smmidth & Co. (Mikall Vogel-Jorgensne).
Non-corrosible steel bimetal suitable for thermostatic use. No. 414,-174. H. A.Wilson & Co. (R. G. Waltenberg).
Rubber hydrochloride-rubber air and gas-proof package. No. 414, 175. Wingfoot Corp. (Chas. O. Pike).
Process for separation of metallic constitutents for alloys. No. 414,-187. Paul Kemp.

Granted and Published August 3, 1943.

Waste sulfite liquor bleaching and purifying process. No. 414,189. Rudolf Bellk, Wilhelm Bellak.
Pressure switch design. No. 414,198. Axel Harry Isidor.
Process for dephosphorization of steel. No. 414,202. Fradon Pirojsha Mehta.
Extraction of hydrocarbons from gas mixture. No. 414-235. British Oxygen Co. Ltd. (Paul Maurice Schuftan).
Binder material for luminiscent screen manufacturers. No. 414,236. Canadian General Electric Co. (Henry Grainger Jenkins).
Manufacture of plastic-cork compositions utilizing high frequency electricity heating. No. 414,241. Canadian Industries Ltd. (Earl Carver Pitman).
Bactericide of polymeric onium compound. No. 414,243. Norman Edw. Searle.
Strength improvement of polyamide filament. No. 414,244. Canadian Industries Ltd. (Paul Rolland Austin).
Wire coating with polymeric amide. No. 414,245. Canadian Industries, Ltd. (Paul Rolland Austin).
Mothproofing composition based on quaternary cyclic monoamidine of benzene series. No. 414,284. J. R. Geigy A. G. (H. Martin, Curt Glatthaar, Alfred Staub, Hans Zaeslin).
Unsaturated ketone insecticide. No. 414,308. Shell Development Co. (Percy E. Joyce).
Heat conserving vat design. No. 414,352. Rene Marcel Payen and Franco-Canadian Dyers Ltd.
Process for production of resinous polyanhydrides of amino acids. No. 414,365. Paul Schlack.

Granted and Published August 10, 1943.

Improved machine for edge grinding lenses. No. 414,385. Alexander Gordon Champion.
Gas atmosphere heating furnace. No. 414,378. John Curran.
Slide rule design. No. 414,383. Alexander Foster.
Distillation and purification of carbonizable organic materials. No. 414,395. Alan Porter Lee.
Thiocyano methyl ester of quaternary ammonium salt. No. 414,463. Heberlein Patent Corp. (Ernst Waltmann).
Photographic material for preparation of coloured photographic prints. No. 414,470. Latta Syndicate Ltd. (Albert G. Tull).
Recovery of silver from waste hyposulfite liquids. No. 414,482. Th. Muhlethaler S. A. (Jacques Quaglia).
Method of recovering tocopherol (vitamin E) from vegetable oils. No. 414,483. Ogilvie Flour Mills Co. Ltd. (Wm. Douglas McFarlane, Wm. Ernest Parker).
Rapidly heat curable polyvinyl ester coating composition. No. 414,-491. Shawinigan Chemicals Ltd. (T. P. G. Shaw, A. F. Price).
Method of making coating resins. No. 414,511. (Otto A. Hansen, Peter Cl. Christensen).

Granted and Published August 17, 1943.

Air or gas compressor. No. 414,531. Edward Cecil Mills.
Separator of vortex type. No. 414,534. Harold Eric Baliol Scott.
Electrical insulation composition comprising nuclear chlorinated ethyl benzene. No. 414,566. Canadian Industries Ltd. (A. A. Levine, O. W. Cass).
Method of condensing metallic vapours. No. 414,582. Dow Chemical Co. (Thos. H. McConnica III, Chas. E. Nelson).
Removal of iron from silica sand by ammonium chloride vapour treatment. No. 414,605. Rockware Glass Syndicate Ltd. (Fred Wm. Adams).

Granted and Published August 24, 1943.

Eczema ointment comprising boric acid, alum, spruce gum, sulfur, castor oil, lard. No. 414,641. J. Oscar Benoit.
Dispensing container. No. 414,654. Chas. Montague Prescott.
Monosubstituted acetonitrile fumigant. No. 414,667. American Cyanamid Co. (Wm. Moore).
Recovery of elemental sulfur from hydrogen sulfide containing gas by catalytic means. No. 414,682. Bolidens Gruvaktiebolag (S. J. Walldeen, R. S. M. Sundgren-Walldeen).
Reverberatory furnace. No. 414,706. M. H. Detrick (Tony Crneich).
Alloy consisting of silicon, calcium and barium. No. 414,710. Electrometallurgical Co. of Canada Ltd. (Augustus B. Kinzel).
Composition for wood preservation. No. 414,732. Monsanto Chemical Co. (R. M. Hitchens).
Apparatus for heat toughening of glass. No. 414,775.
Societe Anonyme des Manufactures des Glaces et Produit Chimique de Saint Gobain (Jean-Louis Schrader).

Granted and Published August 31, 1943.

Impregnation of leather metal polishing elements with soap and silica. No. 414,782. W. R. Borden.
Process for metalization or aluminization of iron articles. No. 414,-810. Goran August Moller.
Paraffin-talc lubricant for wood surfaces. No. 414,813. Albert G. Roberts.
Cold cement glaze production. No. 414,829. J. C. Blair-McGuffie.
Preparation of substituted guanamine. No. 414,842. American Cyanamid Co. (Wilbur Null Oldham).
Fibre glass, super polyamide, synthetic resin, electrical insulator. No. 414,868 Canadian General Electric Co., Ltd. (R. W. Hall, H. A. Smith).
New quaternary ammonium salts having water repellent properties. No. 414,875. Canadian Industries, Ltd. (Imperial Chemical Industries, M. A. T. Rogers).
Insecticidal composition based on alpha(N-phenyl-N-methylamino)-heptyl cyanide. No. 414,877. Canadian Industries Ltd. B. Collie, R. Hill, W. A. Sexton).
Translucent fabric windowshade resembling ground glass. No. 414,-878. Canadian Industries Ltd. (Edgar Hugo Mollan).
Improving affinity of nylon for direct cotton, acetate, and acid, dyestuffs. No. 414,900. Courtaulds Ltd. (Clifford Collier Wilcock).
Thermoplastic formed by reaction of rubber and an acyl halide. No. 414,913. Firestone Tire & Rubber Co. Ltd. (F. L. Kilbourne Jr).
Preparation of heterocyclic fatty acids amides and free acids from heterocyclic aliphatic ketone. No. 414,941. Society of Chemical Industry in Basle. (M. Hartmann, K. Miescher, W. Bosshard, H. Kaegi).

Trademarks of the Month

A Checklist of Chemical and Chemical Specialties Trademarks

406,231. The Elco Grease and Oil Co., Cleveland, O.; filed Nov. 14, 1942; Serial No. 456,821; for sulfur chlorine, naphthenes of lead; since Dec. 9, 1940.

406,232. Max Blatt, as Seal Rite Caulking Co., Brooklyn, N. Y.; filed Jan. 29, 1943; serial No. 458,219; for caulking compounds, since Dec. 24, 1942.

406,376. Sidney H. March, as Radiescent Paint & Color Co., San Francisco, Calif.; filed Mar. 21, 1942; Serial No. 451,821; for paints; since Oct. 25, 1940.

406,480. D. H. Buster Chemical Co., Kansas City, Mo.; filed June 12, 1942; Serial No. 453,613; for floor finish; since Mar. 1, 1942.

406,491. Quintin J. Cristy, as Cristy Drygas Products, Worcester, Mass.; filed June 12, 1943; Serial No. 461,341; for water solvents; since Feb. 10, 1943.

406,500-1. Standard Oil Co. of N. J., Wilmington, Del.; filed Oct. 30, 1943; Serial No. 464,557; for lubricating grease; since Mar. 7, 1939, Mar. 31, 1939.

454,811. Republic Filters, Inc., Paterson, N. J.; filed Aug. 8, 1942; for filtering apparatus; since 1912.

457,999. Sleight Metallic Ink Co. of Pa., Inc., Philadelphia, Pa.; filed Jan. 18, 1943; for inks; since March 1, 1923.

458,241. J. S. Products Corp., N. Y.; filed Jan. 30, 1943; for fire resistant compound; since Jan. 11, 1943.

460,164. United Shoe Machinery Corp., Boston, Mass.; filed Apr. 24, 1943; for adhesives; since Sept. 1, 1911.

460,968. Jacob C. Schachet, as The Tinctorial Co., Denver, Col.; filed May 27, 1943; for waterproofing leather; since Aug. 1, 1924.

461,929. National Lead Co., N. Y.; filed July 8, 1943; for bentonite; since Feb. 1, 1935.

462,297. Textile Service, Inc., Providence, R. I.; filed July 24, 1943; for sizing, finishing, dyeing; since June 10, 1943.

462,931. The Sherwin-Williams Co., Cleveland, O.; filed Aug. 21, 1943; for paint; since Aug. 15, 1942.

463,071. R. S. Gibbs, as Standard Wood Preserver Co., New Orleans, La.; filed Aug. 28, 1943; for paint oil; since July 1, 1942.

463,103. Reichhold Chemicals, Inc., Detroit, Mich.; filed Aug. 30, 1943; for resins; since June 30, 1943.

463,218. R. R. Street & Co., Inc., Chicago, Ill.; filed Sept. 3, 1943; for water repellent; since Aug 1, 1943.

463,228. Colonial Process Supply Co., N. Y.; filed Sept. 4, 1943; for paints; since July 1, 1943.

463,339. Trojan Products & Mfg. Co., Chicago, Ill.; filed Sept. 10, 1943; for mineral compound; since September, 1941.

463,573. Monsanto Chemical Co., St. Louis, Mo.; filed Sept. 22, 1943; for synthetic resins; since June 11, 1943.

464,152. Wyandotte Chemicals Corp., Wyandotte, Mich.; filed Oct. 14, 1943; for dry powders for cleaning; since May 1911.

464,163. R. S. Ghiselin, as the Dazzle Co., Chicago, Ill.; filed Oct. 15, 1943; for detergent for washing; since June 1, 1943.

464,617. The Photo Technical Corp., S. Norwalk, Conn.; filed Nov. 2, 1943; for photographic developer; since Oct. 19, 1943.

464,656. Metasap Chemical Co., Harrison, N. J., filed Nov. 3, 1943; for metallic soap composition; since January 1917.

464,670. National Oil Products Co., Harrison, N. J.; filed Nov. 3, 1943; for cutting oil; since March 1940.

465,496. Wyandotte Chemicals Corp., Wyandotte, Mich.; filed Dec. 3, 1943; for detergent material; since July 21, 1938.

456,526-7. Chlorine Solutions, Inc., Los Angeles, Calif.; filed Dec. 6, 1943; for liquid and solid deodorants; since June 1941.

465,646. P. Joseph Collins, as Atlas Color & Chemical Co., Boston, Mass.; filed Dec. 9, 1943; for agents acting as resist for wool; since Dec. 19, 1935.

465,753. Distributing & Trading Co., N. Y.; filed Dec. 14, 1943; for crude wax; since Oct. 15, 1941.

465,805. D. W. Haering & Co., Inc., Chicago Ill.; filed Dec. 16, 1943; for scale and corrosion control; since Oct. 21, 1935.

465,845. Lotte Chemical Co., Inc., Paterson, N. J.; filed Dec. 17 1943; for control of acid pickling baths; since Dec. 13, 1940.

465,945. Eastman Kodak Co., Jersey City, N. J., and Rochester, N. Y.; filed Dec. 21, 1943; for photographic chemicals; since June 5, 1936.

466,038. Fabric Chemicals Co., Jersey City, N. J.; filed Dec. 24, 1943; for detergent compound; since Sept. 1, 1943.

466,063. Charles Wurdeman as The Rezolin Co., Beverly Hills, Calif.; filed Dec. 24, 1943; for synthetic resins; since April 5, 1939.

466,180-1. The Tremco Mfg. Co., Cleveland, O., filed Dec. 29, 1943; for caulking compounds; since Mar. 30, 1942; for ready-mixed paints; since Nov. 5, 1942.

466,187. Wisconsin Chemical Products, Milwaukee, Wis.; filed Dec. 29, 1943; for rubber cement; since Feb. 7, 1941.

466,246. Homer E. Whitmire as Whitmire Research Labs., St. Louis, Mo., filed Dec. 31, 1943; for insecticidal preparations; since May 27, 1940.

466,338. Wm. Zinsser & Co., Inc., N. Y.; filed Jan. 5, 1944; for granular resinous material; since June 1941.

466,361. Nuguard Chemicals, Inc., E. Paterson, N. J.; filed Jan. 6, 1944; for insecticides, fungicides; since Sept. 13, 1943.

466,490. Servel, Inc., Evansville, Ind., and N. Y.; filed Jan. 11 1944; for lubricating oils; since March 1937.

466,561. R. T. Vanderbilt Co., Inc., N. Y.; filed Jan. 13, 1944; for preventing corrosion of metals; since Jan. 4, 1944.

466,749. Socony-Vacuum Oil Co., Inc., N. Y.; filed Jan. 20, 1944; for paints; since Dec. 30, 1943.

466,788. The Enthone Co., New Haven, Conn.; filed Jan. 22 1944; for oxidizing metal articles; since Mar. 21, 1940.

466,791. The B. F. Goodrich Co., N. Y. and Akron, O;.; filed Jan. 22, 1944; for polyvinyl resins; since Dec. 20, 1943.

466,985. The Elco Grease and Oil Co., Cleveland, O.; filed Jan. 29, 1944; for lubricating oils; since Apr. 15, 1935.

Trademarks reproduced and described include those appearing in Official Gazette of U. S. Patent Office, Mar. 14 to Apr. 4, 1944.

SOLID-COLORD-LEAD CONCENTRATE
THE ELCO GREASE & OIL CO.
406,231

Suit
454,811

LIN-O-LIN
463,071

AUTOSTOP
464,617

SODIUM CHROM GLUCOSATE
465,805

BULLZITE
466,338

HOME-SEAL
406,232

MICO
457,999

RESYNTHETICS
463,103

METASAP
464,656

ACIDEX
465,845

RODALARM
466,361

Flamitized
458,241

REP
463,218

VEGICOD
464,670

D-61
465,945

SERVEL
466,490

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406,376

HUB
460,164

MULTIMARK
463,228

SENECA FLAKES
465,496

ALCONOX
466,038

NACAP
466,561

Sup-R-Seal
406,480

"TEE-SEE"
460,968

QUIK-SIL
463,339

ANTI-KLO
465,526

REZOLIN
466,063

SOVAPAQUE
466,749

CRISTY DRYGAS
406,491

JeloX
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MERSIZE
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KIL-KLO
465,527

DURABILT
466,180

EBONOL
466,786

Brytex
462,297

YELLOW HOOP
464,152

ATLA - KEM
465,646

DURABILT
466,181

GEON
466,791

BASEKOTE
406,500

Kem-Tone
462,931

DAZZLE
464,163

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465,753

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466,187

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466,985

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406,501

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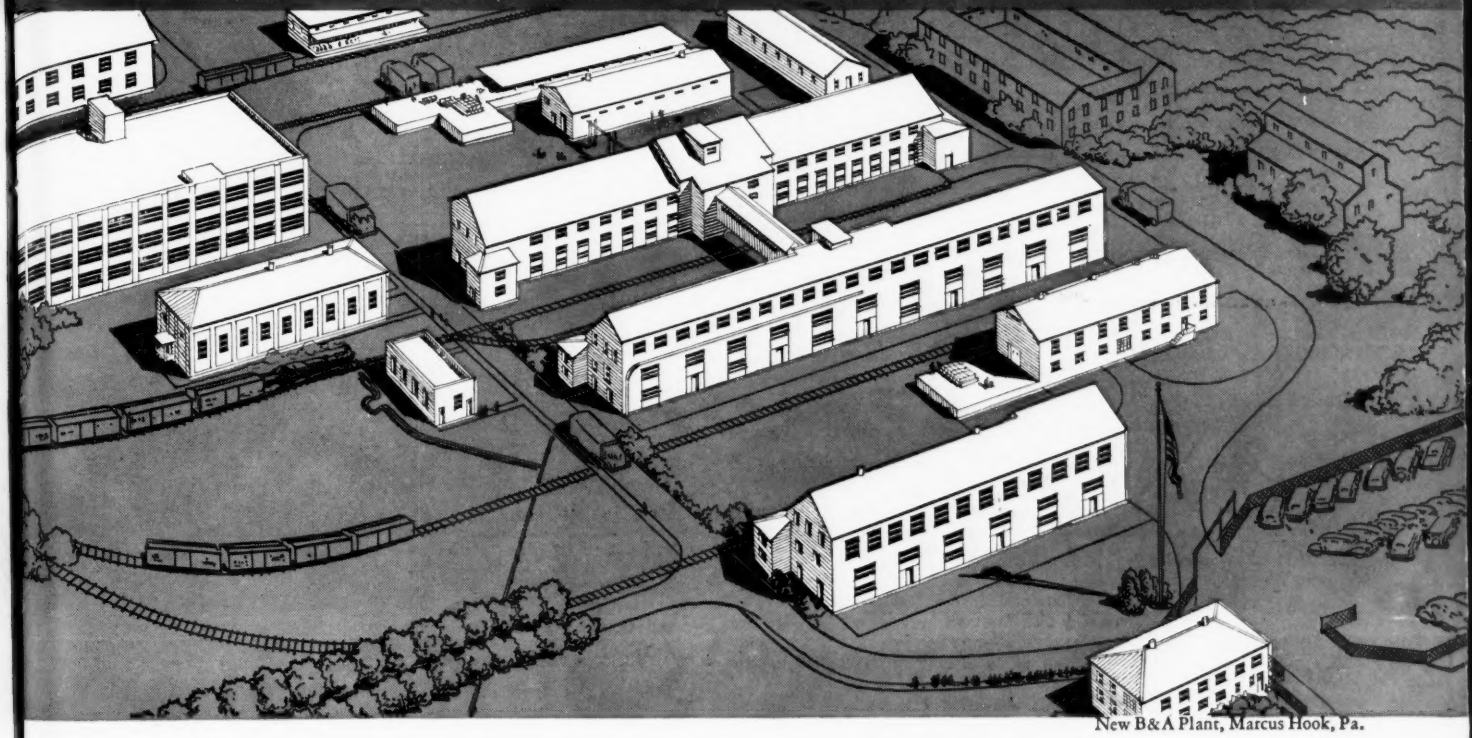

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